



2015 Ozone NAAQS Boundary Recommendation Draft Report

*Air Quality Division
May 31, 2016 Proposed Draft*

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1 Executive Summary and Official Recommendations

In accordance with the Clean Air Act ("CAA") section 107(d)(1) and Arizona Revised Statutes ("A.R.S.") 49-405, this report documents and explains Arizona Department of Environmental Quality's ("ADEQ") recommendations to the governor of Arizona to initially designate areas of the state in response to new 2015 Ozone National Ambient Air Quality Standards of 70 parts per billion.

After consideration of current available data in the context of available guidance and consultation with stakeholders, ADEQ recommends to the governor that most of the state be designated attainment/unclassifiable. ADEQ recommends four nonattainment boundaries for the Phoenix nonattainment area, contingent upon 2016 ozone monitoring data, and a partial county nonattainment area for Yuma County.

The recommendations are conveyed in terms of township, range, and section below and the remainder of the report provides supporting data for the recommendations.

1.1 Township and Ranges for Phoenix Area Data-Contingent Recommended Nonattainment Areas

1.1.1 2008 Maricopa-Pinal Boundary

If, given future ozone design values, neither Pinal County's Queen Valley ozone monitor or Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary continue to be the nonattainment boundary for the 2015 Ozone NAAQS.

Designated Area	Designation Type
Phoenix Area: Maricopa County (part)..... T1N, R1E (except that portion in Indian Country) T1N, R2E T1N, R3E T1N, R4E (except that portion in Indian Country) T1N, R5E (except that portion in Indian Country) T1N, R6E T1N, R7E T1N, R1W T1N, R2W	Nonattainment

Designated Area	Designation Type
T1N, R3W T1N, R4W T1N, R5W T1N, R6W T1N, R7W T1N, R8W T2N, R1E T2N, R2E T2N, R3E T2N, R4E T2N, R6E (except that portion in Indian Country) T2N, R7E (except that portion in Indian Country) T2N, R8E T2N, R9E T2N, R10E T2N, R11E T2N, R12E (except that portion in Gila County) T2N, R13E (except that portion in Gila County) T2N, R1W T2N, R2W T2N, R3W T2N, R4W T2N, R5W T2N, R6W T2N, R7W T2N, R8W T3N, R1E T3N, R2E T3N, R3E T3N, R4E T3N, R5E (except that portion in Indian Country) T3N, R6E (except that portion in Indian Country) T3N, R7E (except that portion in Indian Country) T3N, R8E T3N, R9E T3N, R10E (except that portion in Gila County) T3N, R11E (except that portion in Gila County) T3N, R12E (except that portion in Gila County) T3N, R1W T3N, R2W T3N, R3W T3N, R4W	

Designated Area	Designation Type
<p>T3N, R5W T3N, R6W</p> <p>T4N, R1E T4N, R2E T4N, R3E T4N, R4E T4N, R5E T4N, R6E (except that portion in Indian Country) T4N, R7E (except that portion in Indian Country) T4N, R8E T4N, R9E T4N, R10E (except that portion in Gila County) T4N, R11E (except that portion in Gila County) T4N, R12E (except that portion in Gila County) T4N, R1W T4N, R2W T4N, R3W T4N, R4W T4N, R5W T4N, R6W</p> <p>T5N, R1E T5N, R2E T5N, R3E T5N, R4E T5N, R5E T5N, R6E T5N, R7E T5N, R8E T5N, R9E (except that portion in Gila County) T5N, R10E (except that portion in Gila County) T5N, R1W T5N, R2W T5N, R3W T5N, R4W T5N, R5W</p> <p>T6N, R1E (except that portion in Yavapai County) T6N, R2E T6N, R3E T6N, R4E T6N, R5E T6N, R6E T6N, R7E</p>	

Designated Area	Designation Type
<p>T6N, R8E T6N, R9E (except that portion in Gila County) T6N, R10E (except that portion in Gila County) T6N, R1W (except that portion in Yavapai County) T6N, R2W T6N, R3W T6N, R4W T6N, R5W</p> <p>T7N, R1E (except that portion in Yavapai County) T7N, R2E (except that portion in Yavapai County) T7N, R3E T7N, R4E T7N, R5E T7N, R6E T7N, R7E T7N, R8E T7N, R9E (except that portion in Gila County) T7N, R1W (except that portion in Yavapai County) T7N, R2W (except that portion in Yavapai County)</p> <p>T8N, R2E (except that portion in Yavapai County) T8N, R3E (except that portion in Yavapai County) T8N, R4E (except that portion in Yavapai County) T8N, R5E (except that portion in Yavapai County) T8N, R6E (except that portion in Yavapai County) T8N, R7E (except that portion in Yavapai County) T8N, R8E (except that portion in Yavapai and Gila Counties) T8N, R9E (except that portion in Yavapai and Gila Counties)</p> <p>T1S, R1E (except that portion in Indian Country) T1S, R2E (except that portion in Pinal County and in Indian Country) T1S, R3E T1S, R4E T1S, R5E T1S, R6E T1S, R7E T1S, R1W T1S, R2W T1S, R3W T1S, R4W T1S, R5W T1S, R6W</p>	

Designated Area	Designation Type
T2S, R1E (except that portion in Indian Country) T2S, R5E T2S, R6E T2S, R7E T2S, R1W T2S, R2W T2S, R3W T2S, R4W T2S, R5W T3S, R1E T3S, R1W T3S, R2W T3S, R3W T3S, R4W T3S, R5W T4S, R1E T4S, R1W T4S, R2W T4S, R3W T4S, R4W T4S, R5W T5S, R4W (Sections 1 through 22 and 27 through 34) Pinal County (part) T1N, R8E T1S, R8E (Sections 1 through 12)	Nonattainment

1.1.2 Maricopa-Gila Nonattainment Area

If, given future ozone design values, Gila County's Tonto National Monument ozone monitor violates the 2015 Ozone NAAQS, and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor.

Designated Area	Designation Type
Phoenix Area: Gila County (part).....	Nonattainment

Designated Area	Designation Type
<p>T2N, R12E (except that portion in Maricopa County)</p> <p>T3N, R12E (except that portion in Maricopa County)</p> <p>T4N, R12E (Sections 25 through 29 (except those portions in Maricopa County) and 33 through 36 (except those portions in Maricopa County))</p> <p>Maricopa County (part).....</p> <p>T1N, R1E (except that portion in Indian Country)</p> <p>T1N, R2E</p> <p>T1N, R3E</p> <p>T1N, R4E (except that portion in Indian Country)</p> <p>T1N, R5E (except that portion in Indian Country)</p> <p>T1N, R6E</p> <p>T1N, R7E</p> <p>T1N, R1W</p> <p>T1N, R2W</p> <p>T1N, R3W</p> <p>T1N, R4W</p> <p>T1N, R5W</p> <p>T1N, R6W</p> <p>T1N, R7W</p> <p>T1N, R8W</p> <p>T2N, R1E</p> <p>T2N, R2E</p> <p>T2N, R3E</p> <p>T2N, R4E</p> <p>T2N, R6E (except that portion in Indian Country)</p> <p>T2N, R7E (except that portion in Indian Country)</p> <p>T2N, R8E</p> <p>T2N, R9E</p> <p>T2N, R10E</p> <p>T2N, R11E</p> <p>T2N, R12E (except that portion in Gila County)</p> <p>T2N, R13E (except that portion in Gila County)</p> <p>T2N, R1W</p> <p>T2N, R2W</p> <p>T2N, R3W</p> <p>T2N, R4W</p> <p>T2N, R5W</p> <p>T2N, R6W</p> <p>T2N, R7W</p>	Nonattainment

Designated Area	Designation Type
<p>T2N, R8W</p> <p>T3N, R1E T3N, R2E T3N, R3E T3N, R4E T3N, R5E (except that portion in Indian Country) T3N, R6E (except that portion in Indian Country) T3N, R7E (except that portion in Indian Country) T3N, R8E T3N, R9E T3N, R10E (except that portion in Gila County) T3N, R11E (except that portion in Gila County) T3N, R12E (except that portion in Gila County) T3N, R1W T3N, R2W T3N, R3W T3N, R4W T3N, R5W T3N, R6W</p> <p>T4N, R1E T4N, R2E T4N, R3E T4N, R4E T4N, R5E T4N, R6E (except that portion in Indian Country) T4N, R7E (except that portion in Indian Country) T4N, R8E T4N, R9E T4N, R10E (except that portion in Gila County) T4N, R11E (except that portion in Gila County) T4N, R12E (except that portion in Gila County) T4N, R1W T4N, R2W T4N, R3W T4N, R4W T4N, R5W T4N, R6W</p> <p>T5N, R1E T5N, R2E T5N, R3E T5N, R4E T5N, R5E</p>	

Designated Area	Designation Type
<p>T5N, R6E T5N, R7E T5N, R8E T5N, R9E (except that portion in Gila County) T5N, R10E (except that portion in Gila County) T5N, R1W T5N, R2W T5N, R3W T5N, R4W T5N, R5W</p> <p>T6N, R1E (except that portion in Yavapai County) T6N, R2E T6N, R3E T6N, R4E T6N, R5E T6N, R6E T6N, R7E T6N, R8E T6N, R9E (except that portion in Gila County) T6N, R10E (except that portion in Gila County) T6N, R1W (except that portion in Yavapai County) T6N, R2W T6N, R3W T6N, R4W T6N, R5W</p> <p>T7N, R1E (except that portion in Yavapai County) T7N, R2E (except that portion in Yavapai County) T7N, R3E T7N, R4E T7N, R5E T7N, R6E T7N, R7E T7N, R8E T7N, R9E (except that portion in Gila County) T7N, R1W (except that portion in Yavapai County) T7N, R2W (except that portion in Yavapai County)</p> <p>T8N, R2E (except that portion in Yavapai County) T8N, R3E (except that portion in Yavapai County) T8N, R4E (except that portion in Yavapai County) T8N, R5E (except that portion in Yavapai County) T8N, R6E (except that portion in Yavapai County) T8N, R7E (except that portion in Yavapai County)</p>	

Designated Area	Designation Type
<p>T8N, R8E (except that portion in Yavapai and Gila Counties)</p> <p>T8N, R9E (except that portion in Yavapai and Gila Counties)</p> <p>T1S, R1E (except that portion in Indian Country)</p> <p>T1S, R2E (except that portion in Pinal County and in Indian Country)</p> <p>T1S, R3E</p> <p>T1S, R4E</p> <p>T1S, R5E</p> <p>T1S, R6E</p> <p>T1S, R7E</p> <p>T1S, R1W</p> <p>T1S, R2W</p> <p>T1S, R3W</p> <p>T1S, R4W</p> <p>T1S, R5W</p> <p>T1S, R6W</p> <p>T2S, R1E (except that portion in Indian Country)</p> <p>T2S, R5E</p> <p>T2S, R6E</p> <p>T2S, R7E</p> <p>T2S, R1W</p> <p>T2S, R2W</p> <p>T2S, R3W</p> <p>T2S, R4W</p> <p>T2S, R5W</p> <p>T3S, R1E</p> <p>T3S, R1W</p> <p>T3S, R2W</p> <p>T3S, R3W</p> <p>T3S, R4W</p> <p>T3S, R5W</p> <p>T4S, R1E</p> <p>T4S, R1W</p> <p>T4S, R2W</p> <p>T4S, R3W</p> <p>T4S, R4W</p> <p>T4S, R5W</p> <p>T5S, R4W (Sections 1 through 22 and 27 through 34)</p> <p>Pinal County (part)</p> <p>T1N, R8E</p>	

Designated Area	Designation Type
T1S, R8E (Sections 1 through 12)	Nonattainment

1.1.3 Maricopa-Pinal Nonattainment Area

If, given future ozone design values, Pinal County's Queen Valley ozone monitor violates the 2015 Ozone NAAQS and Gila County's Tonto National Monument ozone monitor attains the 2015 NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley.

Designated Area	Designation Type
Phoenix Area: Maricopa County (part)..... T1N, R1E (except that portion in Indian Country) T1N, R2E T1N, R3E T1N, R4E (except that portion in Indian Country) T1N, R5E (except that portion in Indian Country) T1N, R6E T1N, R7E T1N, R1W T1N, R2W T1N, R3W T1N, R4W T1N, R5W T1N, R6W T1N, R7W T1N, R8W T2N, R1E T2N, R2E T2N, R3E T2N, R4E T2N, R6E (except that portion in Indian Country) T2N, R7E (except that portion in Indian Country) T2N, R8E T2N, R9E T2N, R10E T2N, R11E T2N, R12E (except that portion in Gila County)	Nonattainment

Designated Area	Designation Type
<p>T2N, R13E (except that portion in Gila County)</p> <p>T2N, R1W</p> <p>T2N, R2W</p> <p>T2N, R3W</p> <p>T2N, R4W</p> <p>T2N, R5W</p> <p>T2N, R6W</p> <p>T2N, R7W</p> <p>T2N, R8W</p> <p>T3N, R1E</p> <p>T3N, R2E</p> <p>T3N, R3E</p> <p>T3N, R4E</p> <p>T3N, R5E (except that portion in Indian Country)</p> <p>T3N, R6E (except that portion in Indian Country)</p> <p>T3N, R7E (except that portion in Indian Country)</p> <p>T3N, R8E</p> <p>T3N, R9E</p> <p>T3N, R10E (except that portion in Gila County)</p> <p>T3N, R11E (except that portion in Gila County)</p> <p>T3N, R12E (except that portion in Gila County)</p> <p>T3N, R1W</p> <p>T3N, R2W</p> <p>T3N, R3W</p> <p>T3N, R4W</p> <p>T3N, R5W</p> <p>T3N, R6W</p> <p>T4N, R1E</p> <p>T4N, R2E</p> <p>T4N, R3E</p> <p>T4N, R4E</p> <p>T4N, R5E</p> <p>T4N, R6E (except that portion in Indian Country)</p> <p>T4N, R7E (except that portion in Indian Country)</p> <p>T4N, R8E</p> <p>T4N, R9E</p> <p>T4N, R10E (except that portion in Gila County)</p> <p>T4N, R11E (except that portion in Gila County)</p> <p>T4N, R12E (except that portion in Gila County)</p> <p>T4N, R1W</p> <p>T4N, R2W</p> <p>T4N, R3W</p> <p>T4N, R4W</p>	

Designated Area	Designation Type
<p>T4N, R5W T4N, R6W</p> <p>T5N, R1E T5N, R2E T5N, R3E T5N, R4E T5N, R5E T5N, R6E T5N, R7E T5N, R8E T5N, R9E (except that portion in Gila County) T5N, R10E (except that portion in Gila County) T5N, R1W T5N, R2W T5N, R3W T5N, R4W T5N, R5W</p> <p>T6N, R1E (except that portion in Yavapai County) T6N, R2E T6N, R3E T6N, R4E T6N, R5E T6N, R6E T6N, R7E T6N, R8E T6N, R9E (except that portion in Gila County) T6N, R10E (except that portion in Gila County) T6N, R1W (except that portion in Yavapai County) T6N, R2W T6N, R3W T6N, R4W T6N, R5W</p> <p>T7N, R1E (except that portion in Yavapai County) T7N, R2E (except that portion in Yavapai County) T7N, R3E T7N, R4E T7N, R5E T7N, R6E T7N, R7E T7N, R8E T7N, R9E (except that portion in Gila County) T7N, R1W (except that portion in Yavapai County)</p>	

Designated Area	Designation Type
<p>T7N, R2W (except that portion in Yavapai County)</p> <p>T8N, R2E (except that portion in Yavapai County)</p> <p>T8N, R3E (except that portion in Yavapai County)</p> <p>T8N, R4E (except that portion in Yavapai County)</p> <p>T8N, R5E (except that portion in Yavapai County)</p> <p>T8N, R6E (except that portion in Yavapai County)</p> <p>T8N, R7E (except that portion in Yavapai County)</p> <p>T8N, R8E (except that portion in Yavapai and Gila Counties)</p> <p>T8N, R9E (except that portion in Yavapai and Gila Counties)</p> <p>T1S, R1E (except that portion in Indian Country)</p> <p>T1S, R2E (except that portion in Pinal County and in Indian Country)</p> <p>T1S, R3E</p> <p>T1S, R4E</p> <p>T1S, R5E</p> <p>T1S, R6E</p> <p>T1S, R7E</p> <p>T1S, R1W</p> <p>T1S, R2W</p> <p>T1S, R3W</p> <p>T1S, R4W</p> <p>T1S, R5W</p> <p>T1S, R6W</p> <p>T2S, R1E (except that portion in Indian Country)</p> <p>T2S, R5E</p> <p>T2S, R6E</p> <p>T2S, R7E</p> <p>T2S, R1W</p> <p>T2S, R2W</p> <p>T2S, R3W</p> <p>T2S, R4W</p> <p>T2S, R5W</p> <p>T3S, R1E</p> <p>T3S, R1W</p> <p>T3S, R2W</p> <p>T3S, R3W</p> <p>T3S, R4W</p> <p>T3S, R5W</p> <p>T4S, R1E</p> <p>T4S, R1W</p>	

Designated Area	Designation Type
T4S, R2W T4S, R3W T4S, R4W T4S, R5W T5S, R4W (Sections 1 through 22 and 27 through 34) Pinal County (part) T1N, R8E T1N, R9E T1N, R10E T1S, R8E T1S, R9E T1S, R10E T2S, R8E T2S, R9E (Sections 1 through 6) T2S, R10E (Sections 1 through 6) T3S, R7E T3S, R8E T3S, R9E (Section 19)	Nonattainment

1.1.4 Maricopa-Pinal-Gila Nonattainment Area

If, given future ozone design values, both Pinal County's Queen Valley ozone monitor and Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor, and by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley.

Designated Area	Designation Type
Phoenix Area: Gila County (part)..... T2N, R12E (except that portion in Maricopa County) T3N, R12E (except that portion in Maricopa County)	Nonattainment

Designated Area	Designation Type
<p>T4N, R12E (Sections 25 through 29 (except those portions in Maricopa County) and 33 through 36 (except those portions in Maricopa County))</p> <p>Maricopa County (part).....</p> <p>T1N, R1E (except that portion in Indian Country)</p> <p>T1N, R2E</p> <p>T1N, R3E</p> <p>T1N, R4E (except that portion in Indian Country)</p> <p>T1N, R5E (except that portion in Indian Country)</p> <p>T1N, R6E</p> <p>T1N, R7E</p> <p>T1N, R1W</p> <p>T1N, R2W</p> <p>T1N, R3W</p> <p>T1N, R4W</p> <p>T1N, R5W</p> <p>T1N, R6W</p> <p>T1N, R7W</p> <p>T1N, R8W</p> <p>T2N, R1E</p> <p>T2N, R2E</p> <p>T2N, R3E</p> <p>T2N, R4E</p> <p>T2N, R6E (except that portion in Indian Country)</p> <p>T2N, R7E (except that portion in Indian Country)</p> <p>T2N, R8E</p> <p>T2N, R9E</p> <p>T2N, R10E</p> <p>T2N, R11E</p> <p>T2N, R12E (except that portion in Gila County)</p> <p>T2N, R13E (except that portion in Gila County)</p> <p>T2N, R1W</p> <p>T2N, R2W</p> <p>T2N, R3W</p> <p>T2N, R4W</p> <p>T2N, R5W</p> <p>T2N, R6W</p> <p>T2N, R7W</p> <p>T2N, R8W</p> <p>T3N, R1E</p> <p>T3N, R2E</p>	Nonattainment

Designated Area	Designation Type
T3N, R3E T3N, R4E T3N, R5E (except that portion in Indian Country) T3N, R6E (except that portion in Indian Country) T3N, R7E (except that portion in Indian Country) T3N, R8E T3N, R9E T3N, R10E (except that portion in Gila County) T3N, R11E (except that portion in Gila County) T3N, R12E (except that portion in Gila County) T3N, R1W T3N, R2W T3N, R3W T3N, R4W T3N, R5W T3N, R6W T4N, R1E T4N, R2E T4N, R3E T4N, R4E T4N, R5E T4N, R6E (except that portion in Indian Country) T4N, R7E (except that portion in Indian Country) T4N, R8E T4N, R9E T4N, R10E (except that portion in Gila County) T4N, R11E (except that portion in Gila County) T4N, R12E (except that portion in Gila County) T4N, R1W T4N, R2W T4N, R3W T4N, R4W T4N, R5W T4N, R6W T5N, R1E T5N, R2E T5N, R3E T5N, R4E T5N, R5E T5N, R6E T5N, R7E T5N, R8E T5N, R9E (except that portion in Gila County)	

Designated Area	Designation Type
<p>T5N, R10E (except that portion in Gila County)</p> <p>T5N, R1W</p> <p>T5N, R2W</p> <p>T5N, R3W</p> <p>T5N, R4W</p> <p>T5N, R5W</p> <p>T6N, R1E (except that portion in Yavapai County)</p> <p>T6N, R2E</p> <p>T6N, R3E</p> <p>T6N, R4E</p> <p>T6N, R5E</p> <p>T6N, R6E</p> <p>T6N, R7E</p> <p>T6N, R8E</p> <p>T6N, R9E (except that portion in Gila County)</p> <p>T6N, R10E (except that portion in Gila County)</p> <p>T6N, R1W (except that portion in Yavapai County)</p> <p>T6N, R2W</p> <p>T6N, R3W</p> <p>T6N, R4W</p> <p>T6N, R5W</p> <p>T7N, R1E (except that portion in Yavapai County)</p> <p>T7N, R2E (except that portion in Yavapai County)</p> <p>T7N, R3E</p> <p>T7N, R4E</p> <p>T7N, R5E</p> <p>T7N, R6E</p> <p>T7N, R7E</p> <p>T7N, R8E</p> <p>T7N, R9E (except that portion in Gila County)</p> <p>T7N, R1W (except that portion in Yavapai County)</p> <p>T7N, R2W (except that portion in Yavapai County)</p> <p>T8N, R2E (except that portion in Yavapai County)</p> <p>T8N, R3E (except that portion in Yavapai County)</p> <p>T8N, R4E (except that portion in Yavapai County)</p> <p>T8N, R5E (except that portion in Yavapai County)</p> <p>T8N, R6E (except that portion in Yavapai County)</p> <p>T8N, R7E (except that portion in Yavapai County)</p> <p>T8N, R8E (except that portion in Yavapai and Gila Counties)</p> <p>T8N, R9E (except that portion in Yavapai and Gila Counties)</p> <p>T1S, R1E (except that portion in Indian Country)</p>	

Designated Area	Designation Type
<p>T1S, R2E (except that portion in Pinal County and in Indian Country)</p> <p>T1S, R3E</p> <p>T1S, R4E</p> <p>T1S, R5E</p> <p>T1S, R6E</p> <p>T1S, R7E</p> <p>T1S, R1W</p> <p>T1S, R2W</p> <p>T1S, R3W</p> <p>T1S, R4W</p> <p>T1S, R5W</p> <p>T1S, R6W</p> <p>T2S, R1E (except that portion in Indian Country)</p> <p>T2S, R5E</p> <p>T2S, R6E</p> <p>T2S, R7E</p> <p>T2S, R1W</p> <p>T2S, R2W</p> <p>T2S, R3W</p> <p>T2S, R4W</p> <p>T2S, R5W</p> <p>T3S, R1E</p> <p>T3S, R1W</p> <p>T3S, R2W</p> <p>T3S, R3W</p> <p>T3S, R4W</p> <p>T3S, R5W</p> <p>T4S, R1E</p> <p>T4S, R1W</p> <p>T4S, R2W</p> <p>T4S, R3W</p> <p>T4S, R4W</p> <p>T4S, R5W</p> <p>T5S, R4W (Sections 1 through 22 and 27 through 34)</p> <p>Pinal County (part)</p> <p>T1N, R8E</p> <p>T1N, R9E</p> <p>T1N, R10E</p>	Nonattainment

Designated Area	Designation Type
<p>T1S, R8E T1S, R9E T1S, R10E</p> <p>T2S, R8E T2S, R9E (Sections 1 through 6) T2S, R10E (Sections 1 through 6)</p> <p>T3S, R7E T3S, R8E T3S, R9E (Section 19)</p>	

1.2 Township and Ranges for Recommended Yuma Nonattainment Area

Designated Area	Designation Type
<p>Yuma County (part)¹</p> <p>That portion within Yuma County of the area described by the following:</p> <ol style="list-style-type: none"> 1. Bounded on the north and west by the Arizona state line 2. Bounded on the south by the line of latitude at 32° 39' 20"N 3. Bounded on the east by the line of longitude 114° 33' 50"W 4. And excluding the sections 10, 11, and 12 of township T9S, R23W and any portion in Indian Country 	Nonattainment

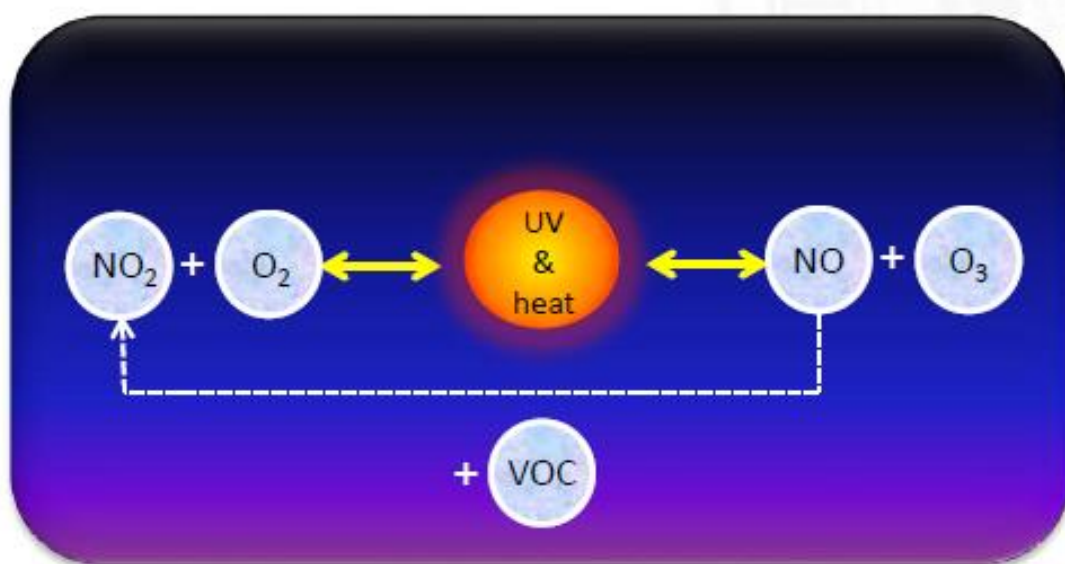
¹ There are conflicting township section grid lines near the state line in this portion of Yuma County. For this reason, ADEQ utilized a different method to describe the Yuma area boundary in this recommendation.

2 Introduction and Background

2.1 Ozone Formation

Ozone is not released directly by any source but is rather a secondary pollutant formed from a complicated process involving precursor pollutants and sunlight. Nitrogen oxides NO_x and VOCs are generally known as the main precursor pollutants to ozone, although other molecules are often involved in formation. Ozone forms naturally in the earth's troposphere² as simplified in [Figure 2-1](#). Nitrogen dioxide (NO₂) and oxygen (O₂) react (i.e. photolyze) under the sun's heat and ultra violet rays to form nitrogen monoxide (NO) and ozone (O₃), and vice versa.³ In a separate reaction, VOCs can oxidize and the resulting free radicals can convert nitrogen monoxide to nitrogen dioxide. This natural VOC reaction disrupts the equal balance of the photocatalytic reaction and allows for a slight accumulation of ozone.⁴

Figure 2-1 Ozone Formation



NO_x and VOCs are both naturally emitted compounds (e.g. NO_x is emitted from soils, lightning, wildfires, and stratospheric intrusions⁵ and VOCs are emitted from live plants, such as pine trees,

² The troposphere is the Earth's lowest atmospheric layer extending "from the earth's surface to about 8 km above polar regions and to about 16 km above tropical regions." EPA, *Air Quality Criteria for Ozone and Related Photochemical Oxidant: Volume II of III*, p. AX2-2 (2006) available at <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=149923&CFID=58102340&cftoken=94355181>.

³ See generally *id.* at AX2-3 – AX-2-5; NASA EARTH OBSERVATORY, *Chemistry in the Sunlight*, http://earthobservatory.nasa.gov/Features/ChemistrySunlight/chemistry_sunlight3.php (last visited May 27, 2016).

⁴ See generally *id.*

⁵ EPA, *Air Quality Criteria for Ozone and Related Photochemical Oxidant: Volume I of III*, p. 2-20 (2006) available at <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=149923&CFID=58102340&cftoken=94355181>.

as byproducts of photosynthesis⁶). However, NO_x and VOCs are also produced by human activity (anthropogenically). Anthropogenically emitted NO_x sources include fossil fuel combustion sources such as car engines and industrial boilers (such as those found at electric generating stations). Anthropogenic VOCs originate from sources such as paints, coatings, and fossil fuels (e.g. gasoline). The addition of more NO_x and VOCs into the equation, as a result of anthropogenic emissions, causes the accumulation of ozone concentrations to approach unhealthy and environmentally dangerous levels. Accumulation of ozone is especially likely to occur in urban areas where man-made NO_x and VOC emissions are very high.⁷ Urban populations are therefore likely the most affected by ozone's negative effects, such as reduction in lung function and respiratory inflammation and distress.⁸ Ozone can also cause disruptions in ecosystems and reductions in plant growth, including crop yield loss.⁹

2.2 Legal Requirements and Guidance

In accordance with Clean Air Act ("CAA") section 108, the Environmental Protection Agency ("EPA") Administrator must identify, list, and issue criteria for certain air pollutants that in her "judgment, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare." EPA has listed six such pollutants, commonly called "criteria pollutants." Because of ozone's negative health and welfare (i.e. environment) effects, ozone is regulated through the CAA as a criteria pollutant. According to CAA section 109, EPA must set emission standards for criteria pollutants, also known as National Ambient Air Quality Standards (NAAQS).

Once EPA establishes or revises the NAAQS, CAA section 107(d)(1) mandates the governor of each state to submit initial area designations to the EPA within the time required by EPA, but no later than one year after the NAAQS revision. The initial designations must list all areas within the state as either nonattainment, attainment, or unclassifiable. A nonattainment area is any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard ("NAAQS") for the pollutant. An attainment area is any area outside of a nonattainment area that meets the NAAQS. An unclassifiable area is any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

⁶ See *id.* at 2-21; D. Ehhalt, M. Prather, et al., *Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report: Climate Change 2001, Working Group I: The Scientific Basis, Chapter 4, Section 4.2.3.2* available at http://www.grida.no/publications/other/ipcc_tar/?src=/climate/ipcc_tar/wg1/127.htm (last visited May 27, 2016).

⁷ See EPA, *Criteria for Ozone*, *supra* note 5 at E-6 ("The daily maximum 1-h O₃ concentrations tend to be much higher in large urban areas or in areas downwind of large urban areas.").

⁸ See generally EPA, *supra* note 5 at E-10 – E-23.

⁹ See generally EPA, *supra* note 5 at E-23 – E-30.

ADEQ is tasked with preparing the boundary designations and supporting documents for the entire state of Arizona.¹⁰ According to Arizona statute, ADEQ's proposed recommendations must first be completed and posted on ADEQ's website between 4 and 5 months before they are due to the governor.¹¹ ADEQ must then hold a public hearing regarding the recommendations after a comment period.¹² These proposed recommendations are then submitted to the governor at least one month before the governor must submit his initial designations.¹³ Finally, the governor submits his initial boundary designations to the EPA before the federally imposed deadline.

EPA most recently revised and promulgated the ozone NAAQS to 70 ppb¹⁴ on October 1, 2015.¹⁵ In order to comply with CAA section 107(d)(A) and the 2015 Ozone standard final rule,¹⁶ all states' initial boundary designations are due before October 1, 2016. ADEQ's draft recommendation is further time constrained by state statute as noted above.

To comply with statutory time constraints, ADEQ collected and analyzed data as it became available. ADEQ also applied current guidance as it became available, including EPA's Background White Paper¹⁷ and Boundary Guidance.¹⁸ Attachment 3 of the Boundary Guidance lays out the main factors to consider in determining nonattainment area boundaries for the 2015 Ozone NAAQS. EPA will consider this guidance and associated factors in determining final boundary designations. The five guiding factors and a short summary of each follows:

1. Air Quality Data
2. Emissions and Emissions-Related Data
3. Meteorology
4. Geography/Topography
5. Jurisdictional Boundaries

For air quality data, designators are guided to identify all monitors in an area, all monitored violations, and design values for all monitors. Such data should exclude concurred exceptional event data. States will use 2013-2015 monitored design value data for initial designations, while EPA will use 2014-2016 data. EPA suggests evaluating historical trend data to provide a greater

¹⁰ See Arizona Revised Statutes § 49-405 (2015) available at <http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00405.htm&Title=49&DocType=ARS>.

¹¹ See *id.*

¹² See *id.*

¹³ See *id.*

¹⁴ As calculated per 40 CFR § 50.19 (2015).

¹⁵ See *National Ambient Air Quality Standards for Ozone Final Rule*, 80 FR 65292, 65435 (Oct. 26, 2015) (standards were promulgated October 1, 2015).

¹⁶ *Id.* at 65438.

¹⁷ *Implementation of the 2015 Primary Ozone NAAQS: Issues Associated with Background Ozone – White Paper for Discussion [Background White Paper]* (December 30, 2015), available at <https://www.epa.gov/ozone-pollution/background-ozone-workshop-and-information>.

¹⁸ *Area Designations [Guidance] for the 2015 Ozone National Ambient Air Quality Standards [Boundary Guidance]*, Memorandum from Janet G. McCabe, Acting Assistant Administrator, to Regional Administrators, Regions 1-10 (February 25, 2016), available at <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data>.

understanding of the nature of ozone issues in an area. EPA also suggests evaluating the spatial and temporal distribution of exceedances.

For emissions and emissions-related data, EPA recommends using the most recent National Emissions Inventory Data to evaluate county level emissions magnitudes and the geographic locations of NO_x and VOC sources. As of the date of this analysis, the most current National Emission Inventory is 2011. EPA encourages examining whether an area is NO_x or VOC limited, although ADEQ notes that when considering background and transported emissions impacts, it is sometimes difficult to make this kind of determination. EPA evaluates emissions data from nearby counties to assess potential contribution (See [Section 2.3.2](#)). EPA points out that while far upwind sources are not “nearby,” an evaluation of an area can identify the impact of emissions from distant sources and differentiate such emissions from nearby emissions. EPA also suggests analyzing population and location of urbanization as these can be indicators of emissions-related activities. In addition, traffic and commuting patterns can directly relate to precursor emissions and can show the interrelatedness to a nearby area. EPA suggests examining major arteries, traffic volume, and vehicle miles traveled (VMT).

EPA encourages evaluating meteorological information to “assess the fate and transport of emissions contributing to ozone concentrations.”¹⁹ The agency also suggests assessing source-receptor analysis relationships using wind speed and wind speed direction, possibly by way of running HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) model trajectories.

EPA states that geography and topography, the location of physical features of land, may influence the fate, formation, and distribution of ozone concentrations.

Jurisdictional boundaries may be considered “once the geographic extent of the violating area and the nearby area contributing to violations is determined...for the purposes of providing a clearly defined legal boundary and carrying out the air quality planning and enforcement functions for nonattainment areas.”²⁰

The final step is that all of the above five factors are then weighed together as a whole in a weight of evidence. Considering all of the factors and data, one conclusion will appear superior to others.

2.3 ADEQ's Approach

2.3.1 ADEQ's Five Factor Data and General Approach

After consideration of current available data in the context of the Boundary Guidance's five factors and consultation with stakeholders, ADEQ recommends most of the state as attainment or unclassifiable areas. ADEQ also recommends four boundaries for the Phoenix nonattainment

¹⁹ *Boundary Guidance*, *supra* note 18, Attachment 3 at 7.

²⁰ *Boundary Guidance*, *supra* note 18, Attachment 3 at 10.

area, contingent upon 2016 monitoring data, and a partial county nonattainment area for Yuma County. These recommendations are based on monitoring data for the years 2013 through 2015. Given future design values, ADEQ may revise these recommendations.

ADEQ analyzed the best available data using the guiding five factors. The general sources of analyzed data are presented in Tables A1-1, -2, -3, -4, and -5 in Section A1.1 of Appendix A.

For air quality data, ADEQ analyzed 2015 design values based on the 4th highest maximum daily values for 2013-2015. Design values for the entire state are available in the attached Table A2-1 of Appendix A. All design values are derived from certified data monitored according to 40 CFR Part 58, including both CASTNET, ADEQ, and county operated monitors. Most ADEQ operated ozone monitors in the state have historically reported data for the ozone season only (April through October), per 40 CFR Part 58, Appendix D, Paragraph 4.1(i) and Arizona's approved annual network plans.²¹ However, from 2016 forward the monitors will report year-round. ADEQ notes that while no exceptional events are concurred with by EPA, there is at least one exceptional event demonstration planned for submission to the EPA that may impact attainment status for future year design values. See Figure A2-1 in Section A2.1 of Appendix A for an overall picture of the Arizona's monitoring network.

For emissions and emissions related data, ADEQ analyzed the following resources: the 2011 National Emissions Inventory ("2011 NEI"); 2014 permitted synthetic minor and major point source reporting data from ADEQ, Maricopa County, and Pinal County ("2014 point source data"); EPA transport modeling information ("EPA transport modeling"); U.S. Department of Agriculture data ("USDA data"); Arizona State Land Department land ownership data ("AZ land ownership data"); U.S. Census population data for 2000 and 2010 ("U.S. Census data"); Pinal County prison populations; Highway Performance Monitoring System (HPMS) traffic data; U.S. Department of Transportation statistics on border crossing data; and metropolitan planning organizations' (MPO) regional transportation plans (RTPs). Regarding traffic data, ADEQ looked at both average annual daily traffic (AADT),²² and vehicle miles traveled (VMT).²³ ADEQ found that visually viewing roads in terms of VMT was unrepresentative in that not all traffic-counted road segments are the same length. Hence, all visual representations are shown in terms of AADT. VMT is provided as an area-wide estimate based on HPMS-sourced AADT for a specific area.

For meteorological data, ADEQ extracted real time data for the design value period from various sites, unless no meteorological data was available onsite. Using the best available meteorological data, ADEQ created annual average wind roses and wind roses for the 10 highest concentration days between 2013 and 2015. ADEQ also ran HYSPLIT model trajectories for at least the 10 highest days for every violating monitor in the state. ADEQ only included some of the HYSPLIT model results in this document, but all information is available upon request. ADEQ performed

²¹ For more information see Appendix A (2015 Ozone Boundary Recommendation TSD), Section A2.1: Ozone Design Values.

²² ADT is a bidirectional count of average number of cars passing through a particular road segment in one day

²³ VMT is ADT multiplied by the length of the counted road segment, and annual VMT is that number multiplied by the number of days in the year.

analyses juxtaposing HYSPLIT modeling results to hourly concentrations. Meteorological analyses are detailed in Section A3 of Appendix A to this recommendation.

For geographical and topographical maps, ADEQ used available base and reference maps in ESRI and GIS. Meteorological information was analyzed and weighted as appropriate within the context of geography and topography.

Jurisdiction was analyzed by evaluating known entities who have various types of authorities and the physical boundaries of such authorities. ADEQ evaluated what entities have air quality permitting authority, air quality planning authority, transportation planning authority, and where county boundaries, tribal land boundaries, and previously established ozone nonattainment areas are located.

EPA then guides the regions and the states to consider the above five factors together in a weight of evidence analysis. While ADEQ heavily relied on the five factor analysis for evaluating the Phoenix area, ADEQ finds that the five factor analysis is not as relevant to the Yuma County area, and in fact, is not reasonably applied to the area (See [Section 4.6](#))

In developing its recommendations, ADEQ involved as many stakeholders as possible. The agency held public stakeholder meetings on February 23, 2016, April 14, 2016, May 23, 2016, and May 24, 2016. ADEQ closely consulted with several agencies and stakeholders throughout the process, including, but not limited to: Pinal County Air Quality Control District ("PCAQCD"), Maricopa Association of Governments ("MAG"), Maricopa County Air Quality Department ("MCAQD"), Yuma Metropolitan Planning Organization ("YMPO"), and Yuma County officials. In addition, ADEQ held a public hearing regarding the proposed recommendations on [WILL INSERT DATE UPON COMPLETION].

In Section 3 below, ADEQ analyzed the available data to recommend four specific future state nonattainment designation boundary options for the 2015 Ozone standard, contingent upon 2016 data. In Section 4 below, ADEQ identifies a partial county nonattainment boundary for the Yuma nonattainment area. In section 5 below, ADEQ identifies attainment/unclassifiable areas in the state, including Mohave County among other counties.

2.3.2 Transport and Background

As scientists learn more about background and the NAAQS approaches background levels, it becomes increasingly important to attempt to quantify background and transport levels. As standard levels lower, background and transport have a proportionally increased effect on nonattainment concentrations, especially as background levels continue to increase in magnitude. Quantifying background and transport inform how to design effective control strategies and the feasibility of reaching attainment through such control strategies. For this reason, ADEQ weighed transport and background heavily, as appropriate, in its determination of effective boundaries.

2.3.2.1 Transport

Transport has been shown to affect ambient concentrations in Arizona and in the southwestern region generally. Several studies show that long-range interstate and international transport of ozone occurs throughout the atmosphere. A couple of studies performed in northern U.S. cities showed that ozone concentrations over metropolitan areas increase with wind speed, indicating that the transport of ozone and its precursors from upwind areas is important.^{24 25} Another study by Comrie (1994) used an air-mass trajectory analysis to evaluate the sources of high ozone events in rural, forested Pennsylvania and found that the Ohio River Valley and Texas are the most probable sources of NO_x emissions.²⁶ A study by Blumenthal (1997) showed that during episodes of high ozone in the eastern U.S. winds several hundred meters above the ground can transport pollutants from the west, even if surface winds are from another direction.²⁷ Additional studies established that nocturnal low level jets are able to transport pollutants that have been entrained into the residual boundary layer several hundred kilometers, and can contribute to high levels of ozone overnight and in the early morning.²⁸ There have been numerous other studies, such as Levy (1985),²⁹ Lin (2012),³⁰ and Langford (2010)³¹, to show that the transport of surface ozone over long distances is possible, and that previously thought hindrances such as topography and lack of daylight are not as important. There are also several studies performed using chemical modeling to analyze tropospheric ozone transport. EPA performed chemical modeling to assess the impact of transport on ozone concentrations throughout the country. Their analysis utilized the Comprehensive Air Quality Model with Extensions (CAMx version 6.11). This modeling platform utilized a 2011 base year for emissions, meteorology, and other inputs and was then projected forward to 2017.

2.3.2.2 Background

Background has also been shown to affect monitors in Arizona and in the southwestern region generally. EPA's definition for background includes internationally transported emissions and

²⁴ Schichtel, BA; Husar, RB. (2001). Eastern North American transport climatology during high- and low-ozone days. *Atmos Environ* 35: 1029-1038.

²⁵ Husar, RB; Renard, WP. (1998). Ozone as a function of local wind speed and direction: Evidence of local and regional transport. 91st annual meeting and exhibition of the Air & Waste Management Association, San Diego, CA.

²⁶ Comrie, A.C. (1994). Tracking ozone: air-mass trajectories and pollutant source regions influencing ozone in Pennsylvania forests. *Annals of the Association of American Geographers* 84 (4), 635-651.

²⁷ Blumenthal, DL; Lurmann, FW; Kumar, N; Dye, TS; Ray, SE; Korc, ME; Londergan, R; Moore, G. (1997). Transport and mixing phenomena related to ozone exceedances in the northeast US (analysis based on NARSTO-northeast data). Santa Rosa, CA: Sonoma Technology. Retrieved from <http://capita.wustl.edu/otag/reports/otagreport/otagreport.html>

²⁸ Corsmeier, U; Kalthoff, N; Kolle, O; Motzian, M; Fiedler, F. (1997). Ozone concentration jump in the stable nocturnal boundary layer during a LLJ-event. *Atmos Environ* 31: 1977-1989.

²⁹ Levy, H., Muhlman, J. D., Moxim, W. J., & Liu, S. C. (1985). Tropospheric ozone: The role of transport. *Journal of Geophysical Research*, 90(D2), 3753-3772.

³⁰ Lin, M., Fiore, A. M., Horowitz, L. W., Cooper, O. R., Naik, V., Holloway, J., Wyman, B. (2012). Transport of asian ozone pollution into surface air over the western united states in spring. *Journal of Geophysical Research: Atmospheres*, 117(D21), - D00V07.

³¹ Langford, A. O. (2010). Long-range transport of ozone from the Los Angeles basin: A case study. *Geophysical Research Letters*, 37(6).

interstate transport of natural emissions. EPA considers policy relevant background ozone to be any ozone “formed from sources or processes other than U.S. manmade emissions of nitrogen oxides (NO_x), volatile organic compounds (VOC), methane (CH₄), and carbon monoxide (CO).”³² Background ozone can be: (1) naturally produced from sources such as stratospheric intrusion, lightning, wildfires, and vegetation within the U.S. or abroad or (2) manmade abroad from emission sources such as industrial processes, manmade fires, and car emissions outside of U.S. borders. Ozone can exist in the atmosphere for weeks and can be transported long distances, as shown by the literature above. According to a study commissioned by MAG, “background ozone can vary significantly over daily, seasonal, and inter-annual time scales, and over a wide range of spatial scales” and “natural sources contribute significantly to the daily-to-seasonal variability.”³³ However, no model at this time is “capable of precise background estimates on a daily level.”³⁴ Long term background ozone is “influenced by industrialization and climate change trends.”³⁵ Some scientists have evidenced that background is increasing as high as 1 ppb per year.³⁶

2.3.3 “Nearby” Interpretation

In the Boundary Guidance, EPA states that it evaluates emissions data from nearby counties to assess each county’s potential contribution to a violating monitor. “Nearby” in EPA’s view means that EPA will review relevant information associated with Office of Management and Budget delineated statistical boundaries such as Combined Statistical Areas (“CSA”) and Core Based Statistical Areas (“CBSA”, e.g. Metropolitan Statistical Areas (“MSA”)).³⁷ While CBSAs and CSAs do not presumptively form a nonattainment boundary,³⁸ the areas within such CBSAs and CSAs are evaluated to determine whether such areas are likely to be contributing to nearby areas within the same CBSA or CSA.

It is not necessarily appropriate to start with the CBSA or CSA and assume that the entire CBSA or CSA is contributing to a violating monitor. ADEQ believes this is especially true in a state with counties as large as those found in Arizona. Many areas in Arizona are practically, and for all intents and purposes, rural areas. Such areas are still technically a part of an MSA or CSA because there is an urban area somewhere else in the same county, even if not nearby in the general sense of that word. ADEQ also believes that some violating monitors that may be physically nearby, but outside of, a highly populated or high emitting MSA, and impacted mostly by that high emitting area, rather than by other sources within the same CBSA as itself. Hence, ADEQ agrees that CBSAs are not necessarily a good presumptively nearby starting point for a boundary;

³² *Background White Paper*, *supra* note 17, at 2; see also *Ozone Standard Final Rule* *supra* note 15, at 65436.

³³ ENVIRON, *Analysis of Rising Ozone Concentrations in Maricopa County in 2011-2012* (prepared for Maricopa Association of Governments) (July 2013), p. 53, available at http://www.azmag.gov/Documents/EP_2013-11-05_Analysis-of-Rising-Ozone-Concentrations-in-Maricopa-County-in-2011-2012.pdf.

³⁴ *Background White Paper* *supra* note 17, at 4.

³⁵ ENVIRON, *supra* note 33.

³⁶ ENVIRON, *supra* note 33.

³⁷ See *Boundary Guidance*, *supra* note at 5-7.

³⁸ See *Boundary Guidance*, *supra* note at 6.

and in Arizona, given the large size of the counties, CBSAs may also not be an appropriate limiting factor either.

2.3.4 EPA's Mapping Tool

EPA's mapping tool gives an excellent broad view of the state of the country and eases many comparisons between states.³⁹ However, after review, ADEQ believes that EPA's mapping tool is generally not an appropriate tool to use to define nonattainment boundaries in Arizona because the resolution is far too low for the large county sizes in Arizona. In the map, the ratio of populated and developed areas compared to county sizes is relatively small in comparison to other areas in the country. The representation of emissions is therefore skewed. For example, the Dallas-Fort Worth-Arlington MSA is comprised of 11 counties, whereas the Phoenix-Scottsdale-Mesa MSA is made of two vast counties. [Figure 2-2](#) below shows a side by side image comparison in the mapping tool, and [Table 2-1](#) below shows a comparison of land area, emissions, and population between two MSAs. The summed emissions total of the 11 counties that comprise the Dallas area is similar to the Phoenix area sum of emissions from its two vast counties, of which only a limited area is actually urbanized. However, when viewing the mapping tool map, the Dallas-Fort Worth-Arlington area appears to emit less than the Phoenix-Scottsdale-Mesa area as a result of the color coding of the emissions in the individual counties that make up the Dallas and Phoenix areas. On the map, the severity of emissions from the Dallas area's individual counties actually pales in contrast to Phoenix area county contributions because of the vast size of Phoenix area counties in comparison to Dallas area counties.

³⁹ EPA's ozone designations guidance mapping tool is located at <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data#C>.

Figure 2-2 EPA Mapping Tool Phoenix and Dallas MSA Comparison

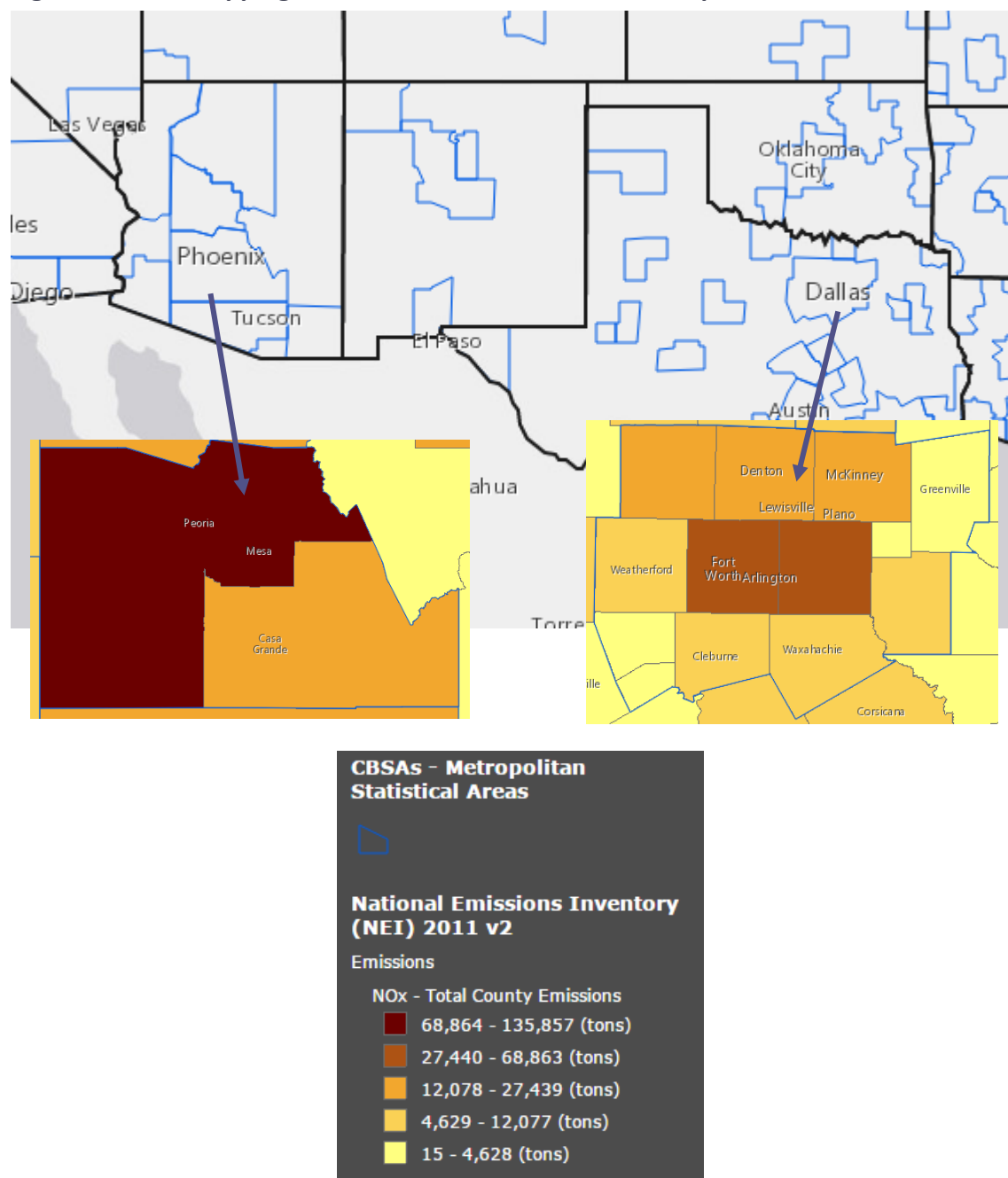


Table 2-1 EPA Mapping Tool Phoenix and Dallas MSA Comparison

Dallas-Fort Worth-Arlington MSA		
Land Area (mi)	9,279	---
Number of Counties	13	
Total 2011 Emissions NOx (TPY)/VOC (TPY)	178,595	307,050
2011 Emissions (TPY) per sq. mi. NOx (TPY)/VOC (TPY)	19.25	33.09
2010 Population	6,426,214	---
2010 Population Density (persons per sq. mi.)	455	

Phoenix-Mesa-Scottsdale MSA		
Land Area (mi)	14,599	---
Number of Counties	2	
Total 2011 Emissions NOx (TPY)/VOC (TPY)	103,347	421,857
2011 Emissions (TPY) per sq. mi. NOx (TPY)/VOC (TPY)	7.08	28.90
2010 Population	4,192,887	---
2010 Population Density (persons per sq. mi.)	287	

Additionally, ADEQ encourages the EPA to refer to ADEQ's VMT calculations for recommended areas as the mapping tool's gridded resolution is a lower resolution than in ADEQ's recommendations. Visually, ADEQ also encourages EPA to consider ADEQ's average annual daily traffic images to understand the actual approximate daily traffic in applicable areas.

Ultimately, ADEQ requests EPA to consider the apparent skew in county versus urban area representation and low VMT resolution when making its final designations.

Finally, ADEQ relied upon ADEQ-produced HYSPLIT and meteorological analyses in its recommendation, except for as applied to the Mohave area.

3 Recommended Data Contingent Nonattainment Areas in the Phoenix Area for the 2015 Ozone NAAQS

ADEQ recommends four data-contingent 2015 Ozone NAAQS nonattainment area boundaries for the Phoenix area:

1. If, given future ozone design values, neither Pinal County's Queen Valley ozone monitor or Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary continue to be the nonattainment boundary for the 2015 Ozone NAAQS. (See [Section 3.1](#))
2. If, given future ozone design values, Gila County's Tonto National Monument ozone monitor violates the 2015 Ozone NAAQS, and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor. (See [Section 3.2](#))
3. If, given future ozone design values, Pinal County's Queen Valley ozone monitor violates and Gila County's Tonto National Monument ozone monitor attains the 2015 Ozone NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley. (See [Section 3.3](#))
4. If, given future ozone design values, both Pinal County's Queen Valley ozone monitor and Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor and by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley. (See [Section 3.4](#))

3.1 2008 Maricopa-Pinal Nonattainment Area

If, given future ozone design values, neither Pinal County's Queen Valley ozone monitor or Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary continue to be the nonattainment boundary for the 2015 Ozone NAAQS. [Figure 3-1](#) below shows the recommended boundary, and [Figure 3-2](#) shows the recommended boundary in the context of other relevant data.

Figure 3-1 2008 Maricopa-Pinal Nonattainment Area

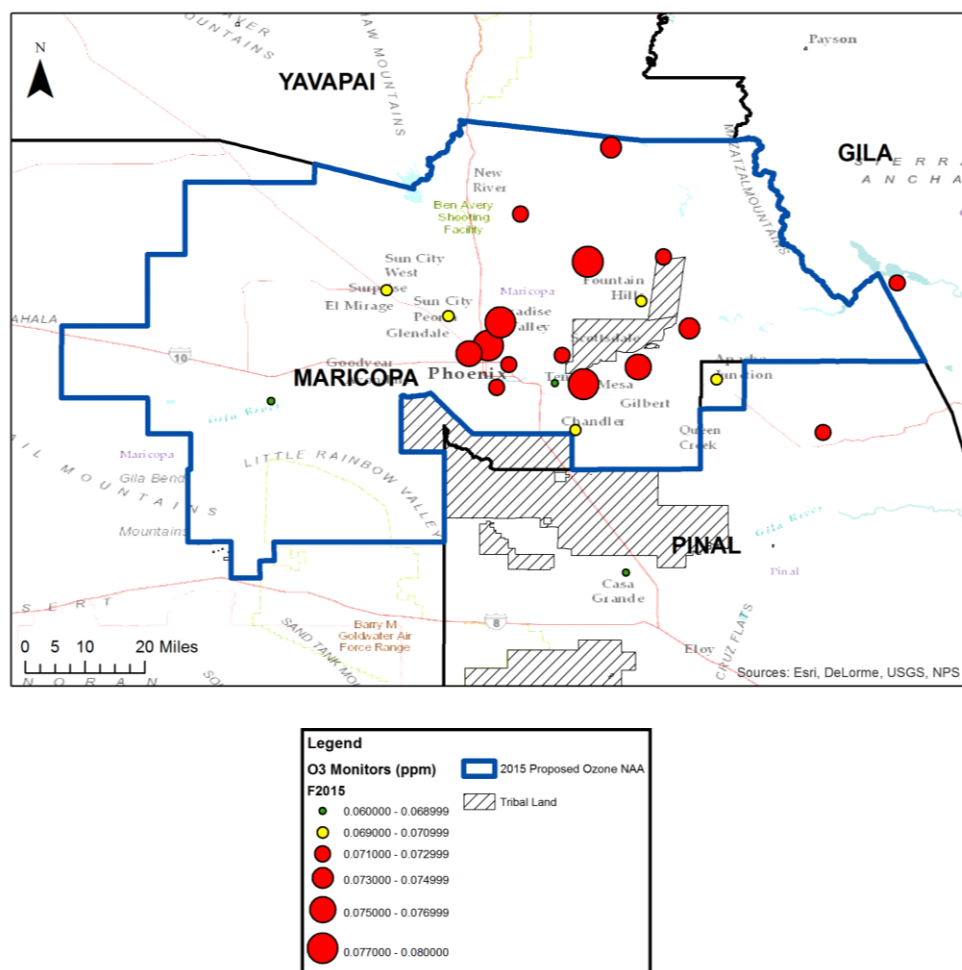
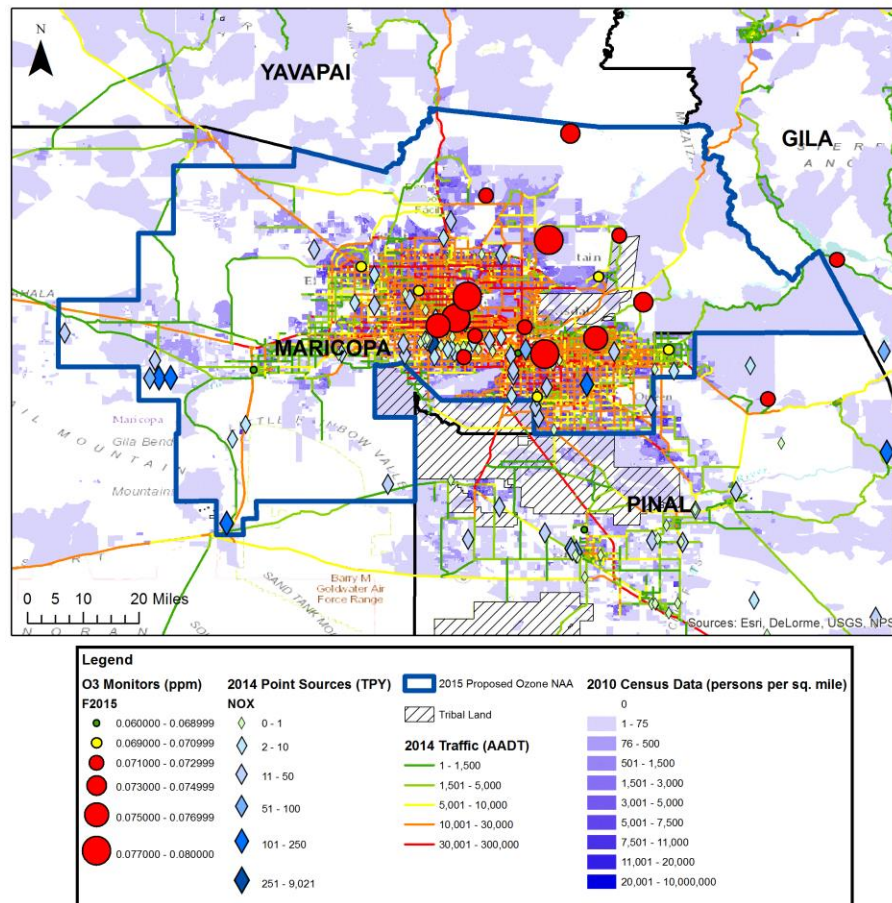


Figure 3-2 2008 Maricopa-Pinal Nonattainment Area with Relevant Data



If there are no violating monitors outside of the current 2008 Phoenix-Mesa Ozone nonattainment area, then ADEQ believes that the area is simply contributing to its own nonattainment, especially given the increase in population density within the area. Population density per square mile changed from 618 in 2000 to 767 in 2010, according to the U.S. Census. For a visual comparison, please see [Figure 3-3](#) and [Figure 3-4](#) below.

Figure 3-3 2008 Maricopa-Pinal Nonattainment Area 2000 Population Density

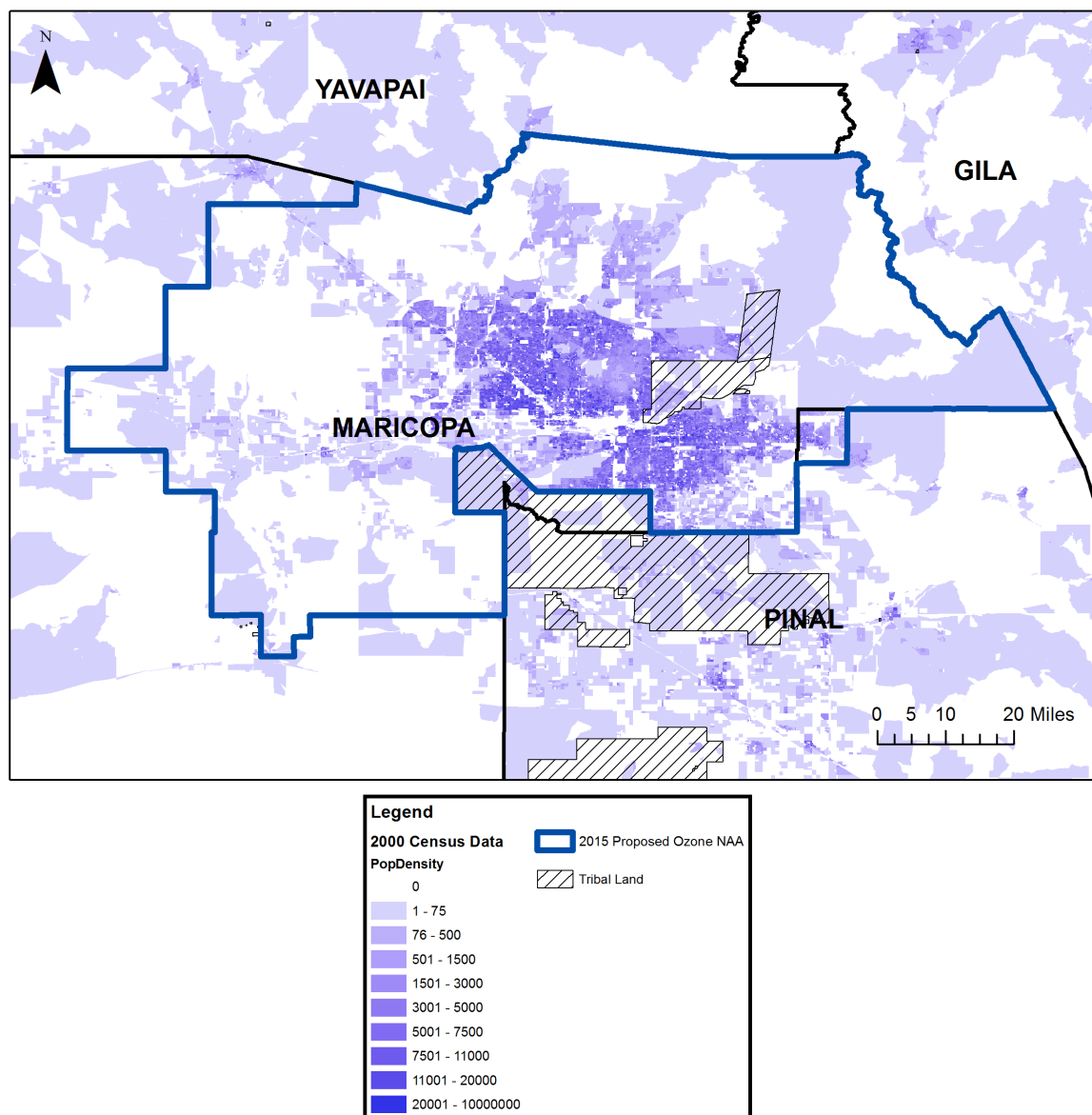
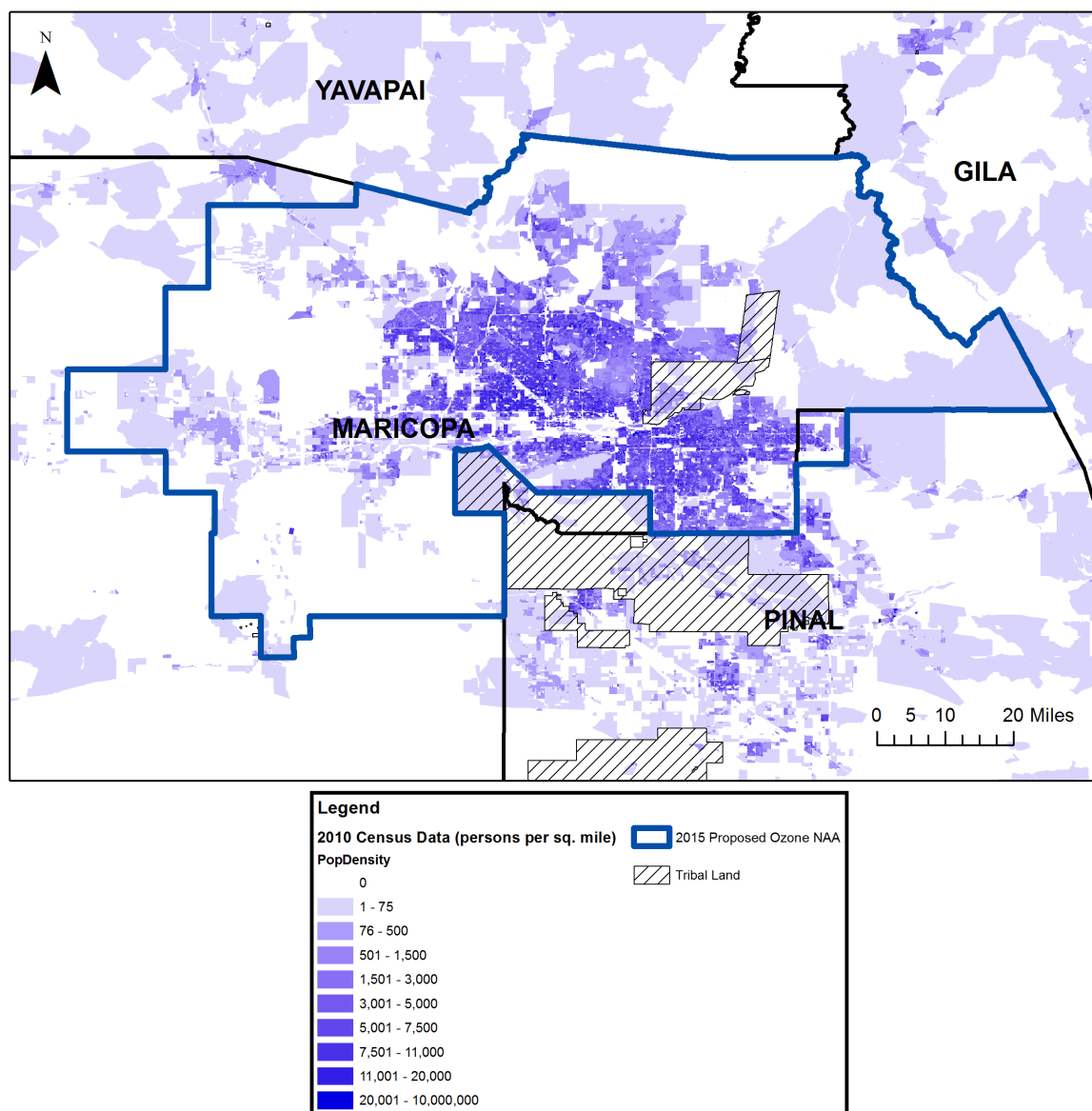


Figure 3-4 2008 Maricopa-Pinal Nonattainment Area 2010 Population Density



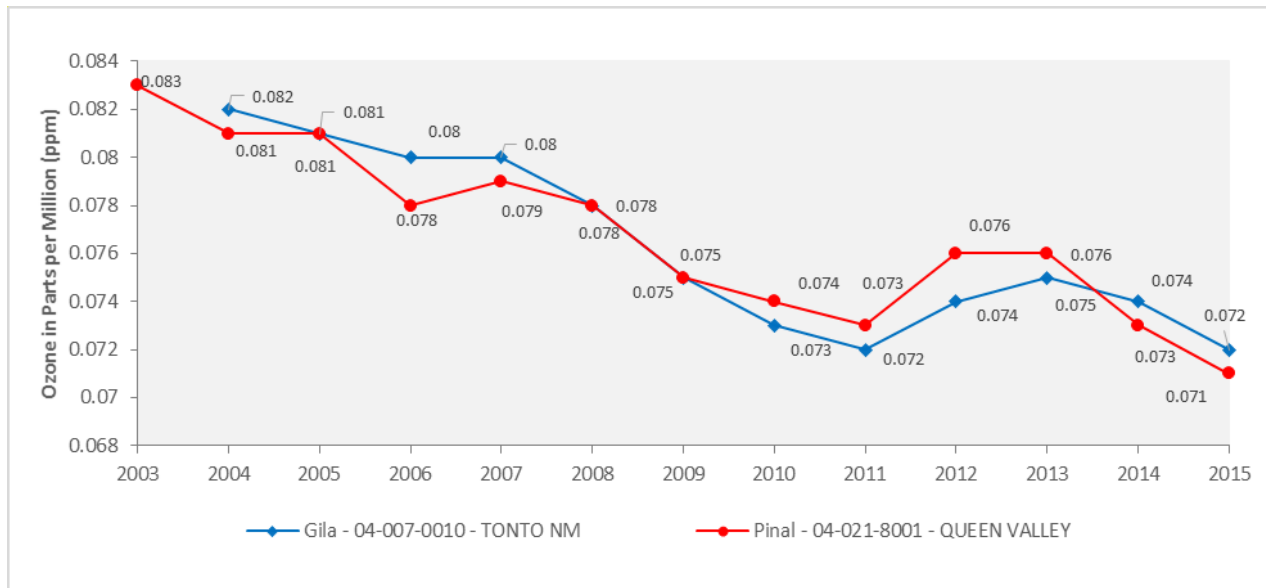
Only four years have passed since the 2008 boundary was set,⁴⁰ and much of the reasoning for setting the boundary is the same, except that Phoenix has likely become more densely populated since 2012. Therefore, ADEQ generally relies on its and EPA's previous analyses for the existing boundary and finds these analyses to also apply to the 2015 Ozone NAAQS, especially if no other monitors outside of the area violate the standard.

In addition, all monitors in the area reflect a long-term downward ozone concentration trend. For example, as shown in [Figure 3-5](#), both the Gila County Tonto National Monument monitor

⁴⁰ See generally *Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards; Final Rule*, 77 FR 30088 (May 21, 2012) available at <https://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0476-0679>.

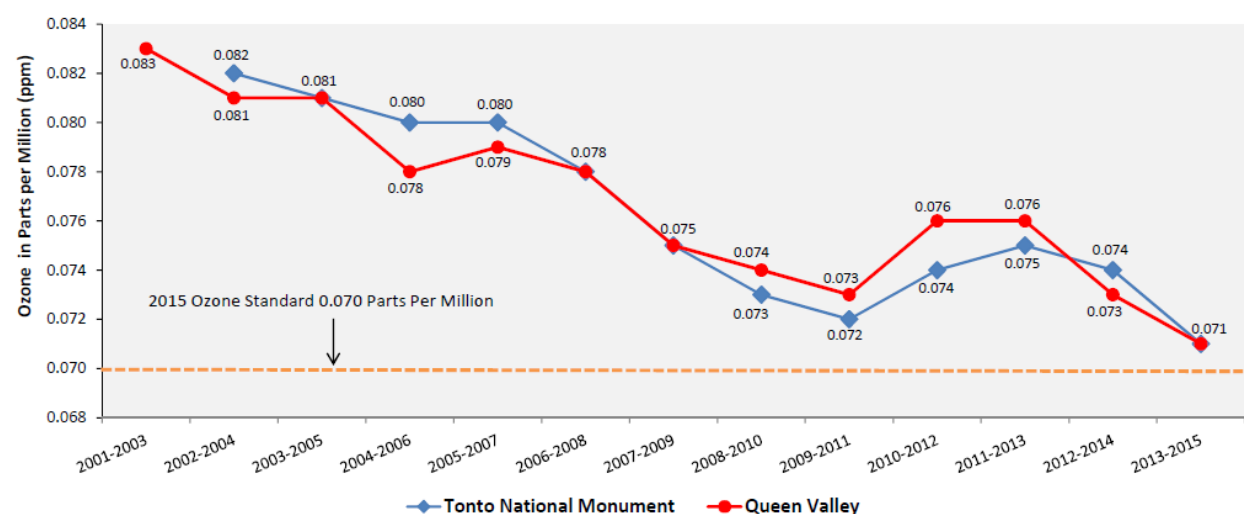
and the Pinal County Queen Valley monitor have carried a long-term downward design value trend, and a short term downward design value trend for the last two years (between 2013 and 2014, and 2014 and 2015).

Figure 3-5 Queen Valley and Tonto National Monument Long-term Trend



Additionally, Arizona and Maricopa County are flagging and in the process of preparing an exceptional event demonstration because of high concentrations resulting from a regional wildfire affecting certain monitors on June 20, 2015. While excluding the exceptional event data does not affect the 2015 design value at Queen Valley, it does affect the 2015 design value by 1 ppb at the Tonto National Monument Gila County monitor, as shown below in [Figure 3-6](#). As demonstrated below, excluding the exceptional event accentuates the National Monument monitor's ozone concentration downward trend, as shown below.

Figure 3-6 Queen Valley and Tonto National Monument Trend Excluding Exceptional Event



3.2 Maricopa-Gila Nonattainment Area

If, given future ozone design values, Gila County's Tonto National Monument ozone monitor violates the 2015 Ozone NAAQS and no other monitor in Pinal County (besides the Apache Junction monitor) violates the standard, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor. [Figure 3-7](#) below shows the recommended boundary, and [Figure 3-8](#) shows the recommended boundary in the context of other relevant data.

Figure 3-7 Maricopa-Gila Nonattainment Area

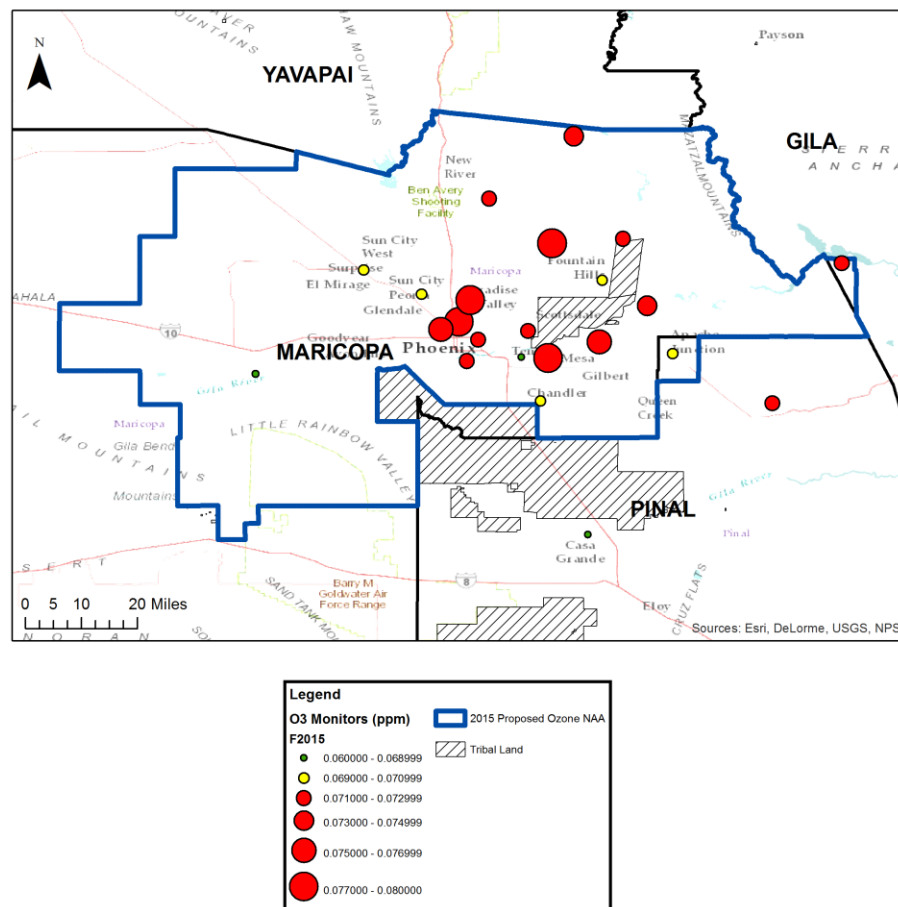
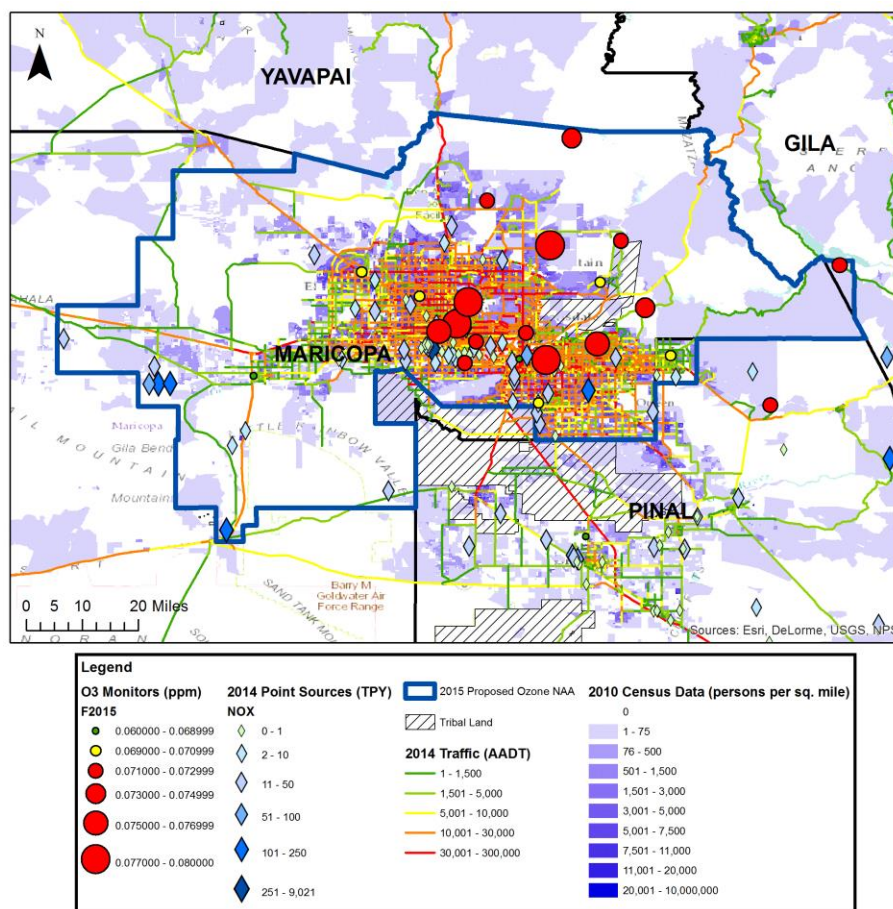
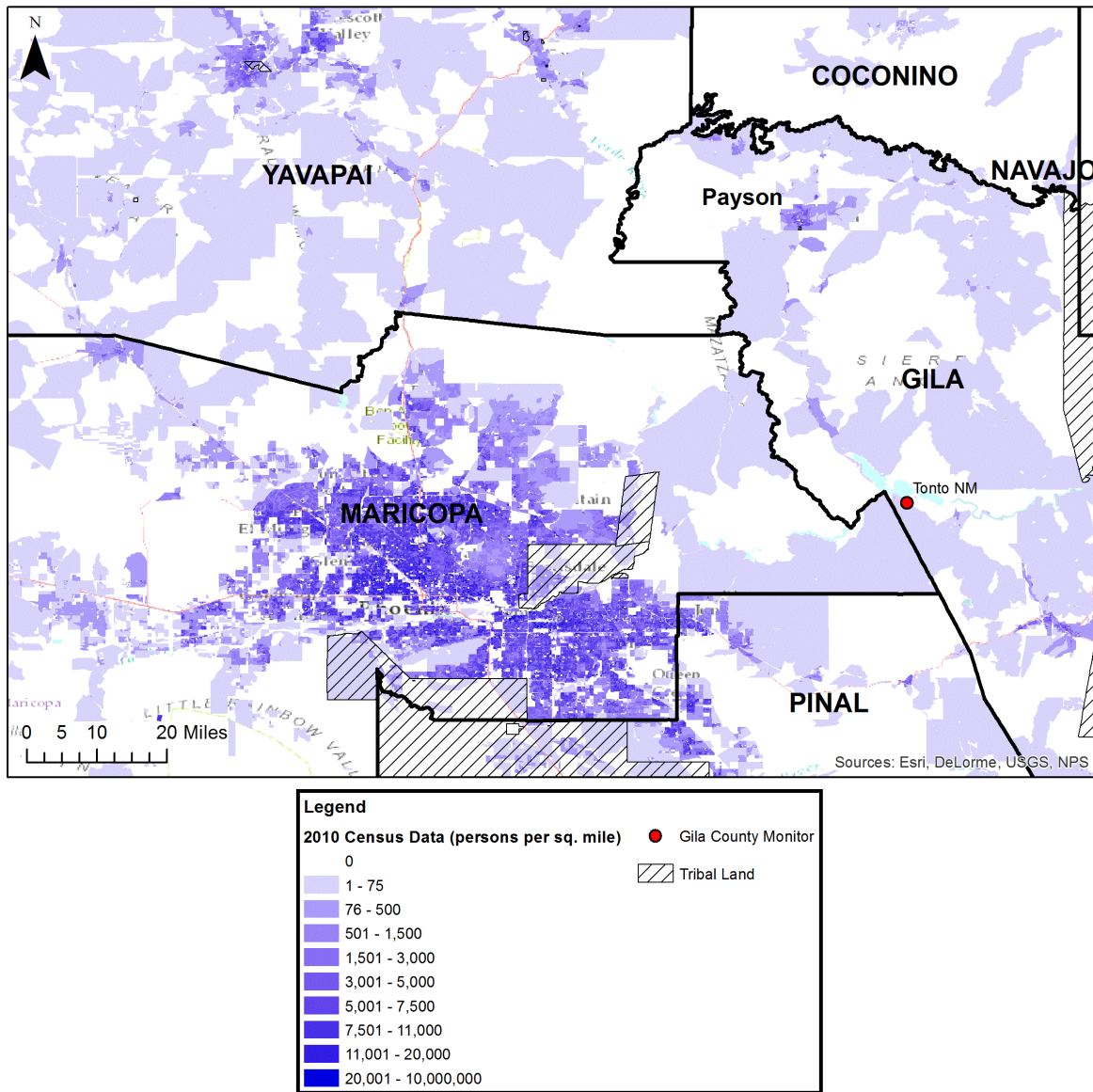


Figure 3-8 Maricopa-Gila Nonattainment Area with Relevant Data



There are very few sources, point or otherwise, in Gila County near the Tonto National Monument Monitor. Gila County is a micropolitan statistical area and the City of Payson is approximately forty miles away from the monitor. There is very little population or traffic near the monitor and the monitor is located on Tonto National Forest land. The Phoenix area is slightly closer to the Gila monitor than the City of Payson, but urban ozone contributing activities are far higher in Maricopa County than Gila County, likely because of the sheer size and population difference between Phoenix and Payson—Phoenix is far larger in both population and size (see [Figure 3-9](#), [Table 3-8](#), and [Table 3-10](#)). These facts limit likely contributing emissions to those emanating from the Phoenix area. Also, considering HYSPLIT modeling results (see [Figure 3-45](#) in [Section 3.4](#) below), the likely contributing sources to high ozone concentrations at the Gila monitor are located in Maricopa County.

Figure 3-9 Phoenix and Payson 2010 Population Density Comparison



3.3 Maricopa-Pinal Nonattainment Area

If, given future ozone design values, Pinal County's Queen Valley ozone monitor violates and Gila County's Tonto National Monument ozone monitor attains the 2015 Ozone NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley. [Figure 3-10](#) below shows the recommended boundary, and [Figure 3-11](#) shows the recommended boundary in the context of other relevant data.

Figure 3-10 Maricopa-Pinal Nonattainment Area

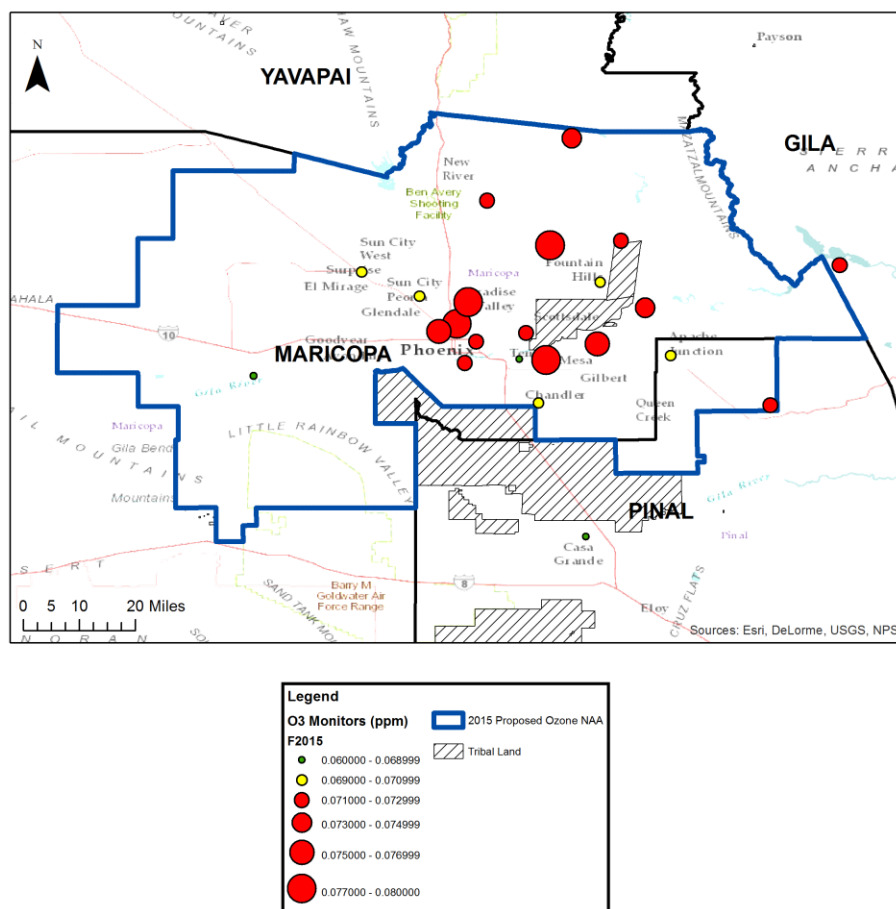
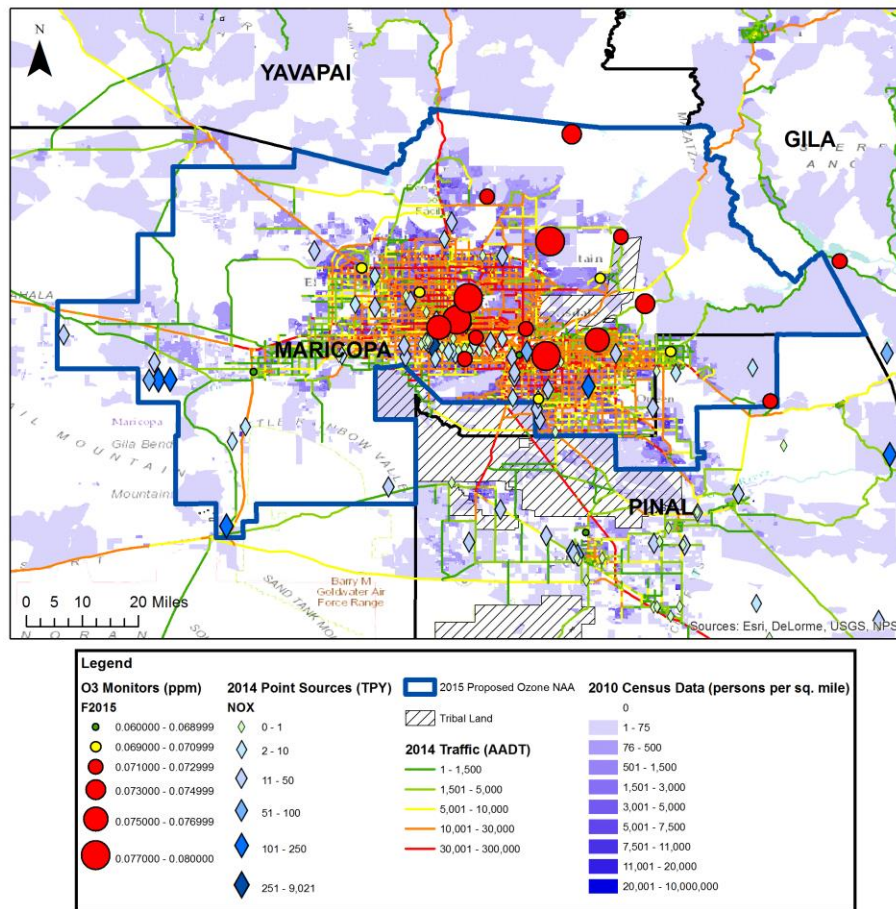


Figure 3-11 Maricopa-Pinal Nonattainment Area with Relevant Data



See [Section 3.4](#) below, especially [Section 3.4.6](#) for reasons why Queen Valley is most likely impacted by the already existing 2008 Phoenix-Mesa Ozone Nonattainment area and the San Tan Valley area.

3.4 Maricopa-Pinal-Gila Nonattainment Area

If, given future ozone design values, both Pinal County's Queen Valley ozone monitor and Gila County's Tonto National Monument ozone monitor violate the 2015 Ozone NAAQS, then Arizona recommends that the 2008 Phoenix-Mesa Ozone Nonattainment Area boundary be expanded by a small section of Gila County to include the Tonto National Monument monitor, and by an additional section of Pinal County to include the Queen Valley monitor and San Tan Valley. [Figure 3-12](#) below shows the recommended boundary, and [Figure 3-13](#) shows the recommended boundary in the context of other relevant data.

Figure 3-12 Maricopa-Pinal-Gila Nonattainment Area

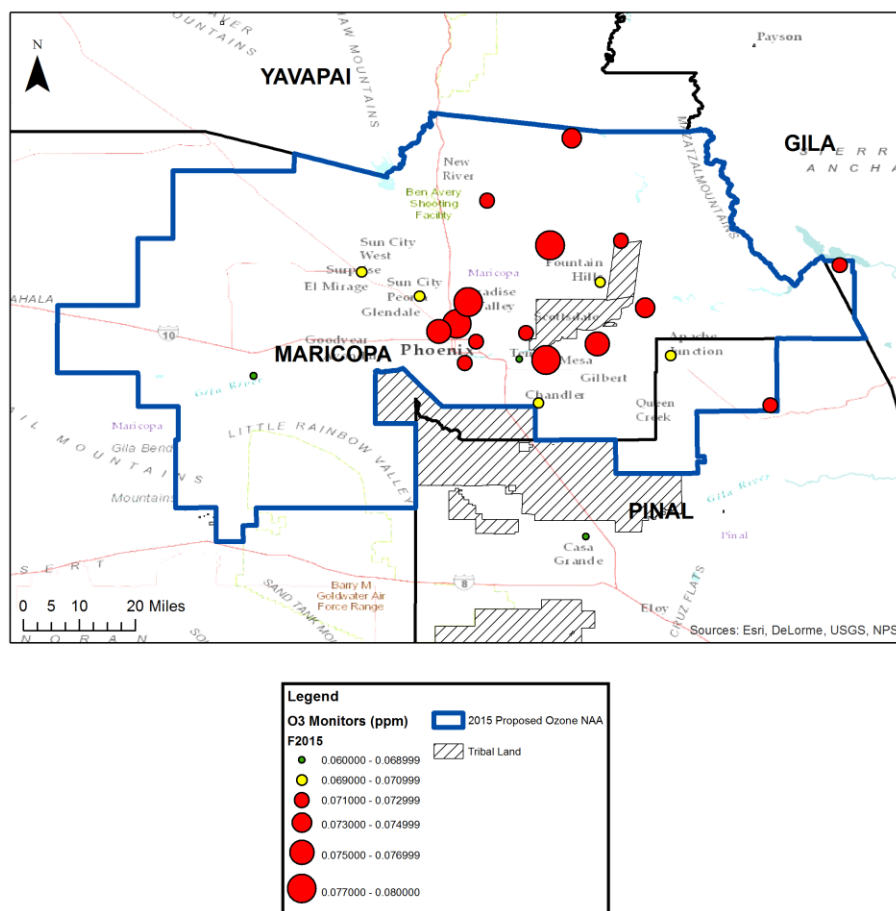
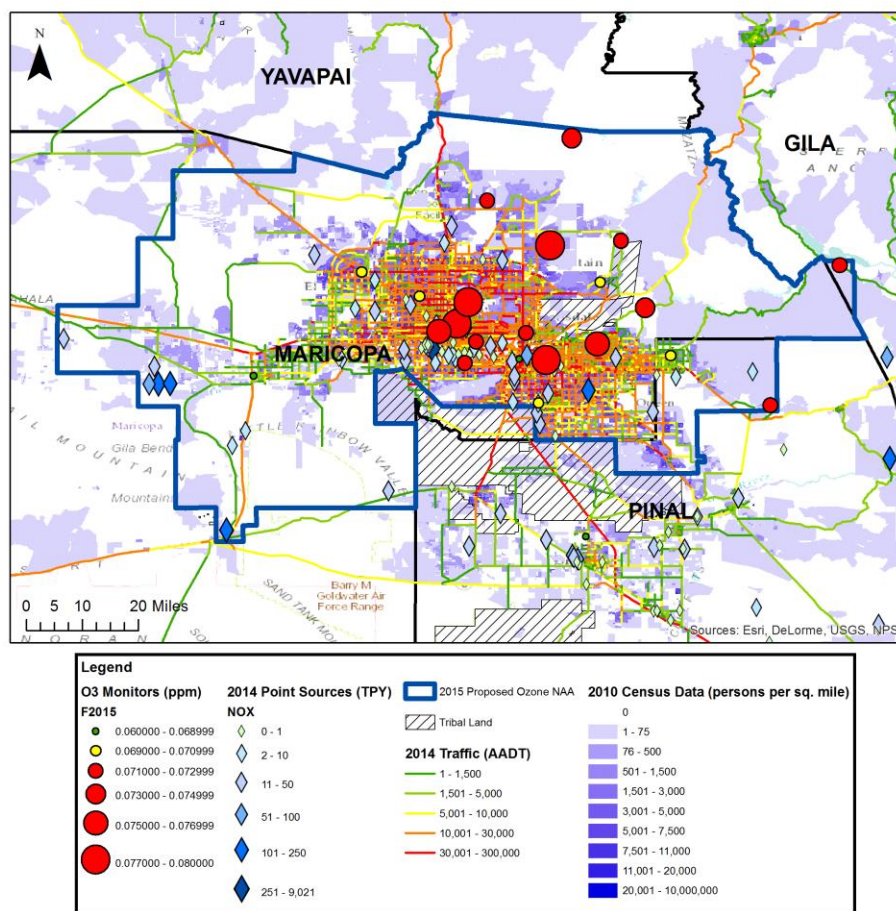


Figure 3-13 Maricopa-Pinal-Gila Nonattainment Area with Relevant Data



3.4.1 Air Quality Data

For this factor, ADEQ considered data from air quality monitors in the existing 2008 Phoenix-Mesa Nonattainment Area, as well as nearby⁴¹ certified monitors. ADEQ also looked at all monitors within Gila County and Pinal County. ADEQ considered the 8-hr ozone design values for these monitors, based on the three most recent consecutive years of certified data, 2013-2015. By policy, the design value (DV) for a recommended area is determined by the monitor with the highest level. For the 2015 DV, there are two monitors with the same DV of 78 ppb, the Pinnacle Peak monitor and the Mesa Monitor. See the DVs for monitors in Maricopa County in [Table 3-1](#) (two highest monitors are shown in bold), Pinal County in [Table 3-2](#), and Gila County in [Table 3-3](#). [Figure 3-14](#) below shows a color-coded map of the monitor locations in the multi-county area.

⁴¹ EPA generally interprets nearby as limited to the CBSA. The Gila monitor is located outside of the Phoenix-Mesa-Scottsdale CBSA, which is comprised of Maricopa and Pinal Counties and is not “nearby” according to this definition. However, it is geographically nearby the existing nonattainment area boundary and considering the five factors, the Gila monitor is likely impacted most by emissions from the Phoenix Metropolitan Area.

Table 3-1 Maricopa County Design Values - All Monitors

County	AQS ID	Colloquial Name	2013-2015 DV (ppm)
Maricopa	04-013-0019	West Phoenix	0.075
	04-013-1003	Mesa	0.078
	04-013-1004	North Phoenix	0.077
	04-013-1010	Falcon Field	0.075
	04-013-2001	Glendale	0.07
	04-013-2005	Pinnacle Peak	0.078
	04-013-3002	Central Phoenix	0.072
	04-013-3003	South Scottsdale	0.071
	04-013-4003	South Phoenix	0.072
	04-013-4004	West Chandler	0.07
	04-013-4005	Tempe	0.064
	04-013-4008	Cave Creek	0.071
	04-013-4010	Dysart	0.07
	04-013-4011	Buckeye	0.06
	04-013-9508	Humboldt Mountain	0.073
	04-013-9702	Blue Point	0.074
	04-013-9704	Fountain Hills	0.069
	04-013-9706	Rio Verde	0.071
	04-013-9997	JLG Supersite	0.077

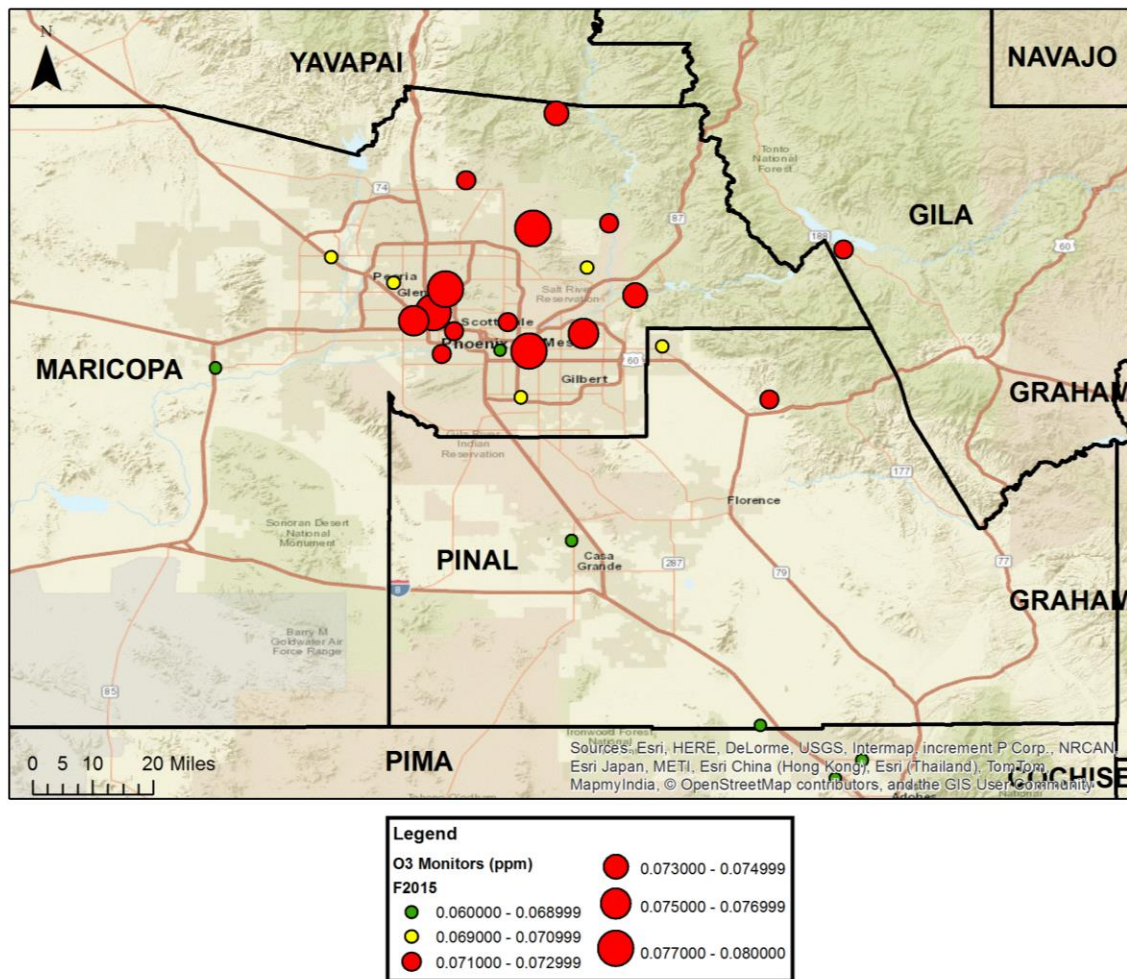
Table 3-2 Pinal County Design Values - All Monitors

County	AQS ID	Colloquial Name	2013-2015 DV (ppm)
Pinal	04-021-3001	AJ Maintenance Yard	0.069
	04-021-3003	Casa Grande Airport	0.065
	04-021-3007	Pinal Air Park	0.065
	04-021-8001	Queen Valley	0.071

Table 3-3 Gila County Design Values - All Monitors

County	AQS ID	Colloquial Name	2013-2015 DV (ppm)
Gila	04-007-0010	Tonto National Monument	0.072

Figure 3-14 Maricopa-Pinal-Gila Monitor Locations



Overall, all monitors in the multi-county area have been trending downward. See [Figure 3-15](#) for the long-term trends in the multi-county area. Because nonattainment areas are defined by their highest violating monitors, the historical trend of one of the two highest nonattaining monitors is shown below in [Figure 3-16](#). The year 2015 marks the Mesa monitor's first valid design value in years. Hence, for purposes of viewing a trend line for the highest monitor in Maricopa County, only the trend for the Pinnacle Peak monitor is shown in [Figure 3-16](#). Historical trends for the Gila and Pinal monitors are shown in [Figure 3-17](#) and [Figure 3-18](#), respectively.

Figure 3-15 Maricopa, Pinal, and Gila Multi-County Long-Term Design Value Trend

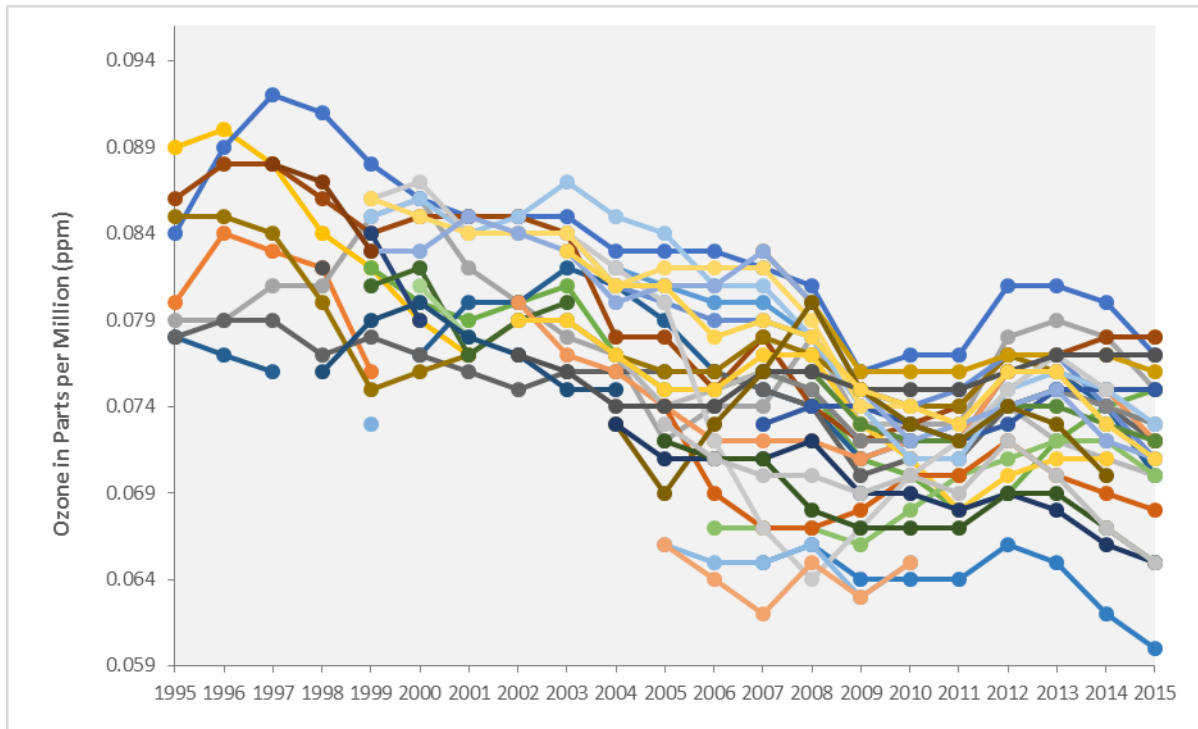


Figure 3-16 Maricopa County Long-Term Design Value Trend

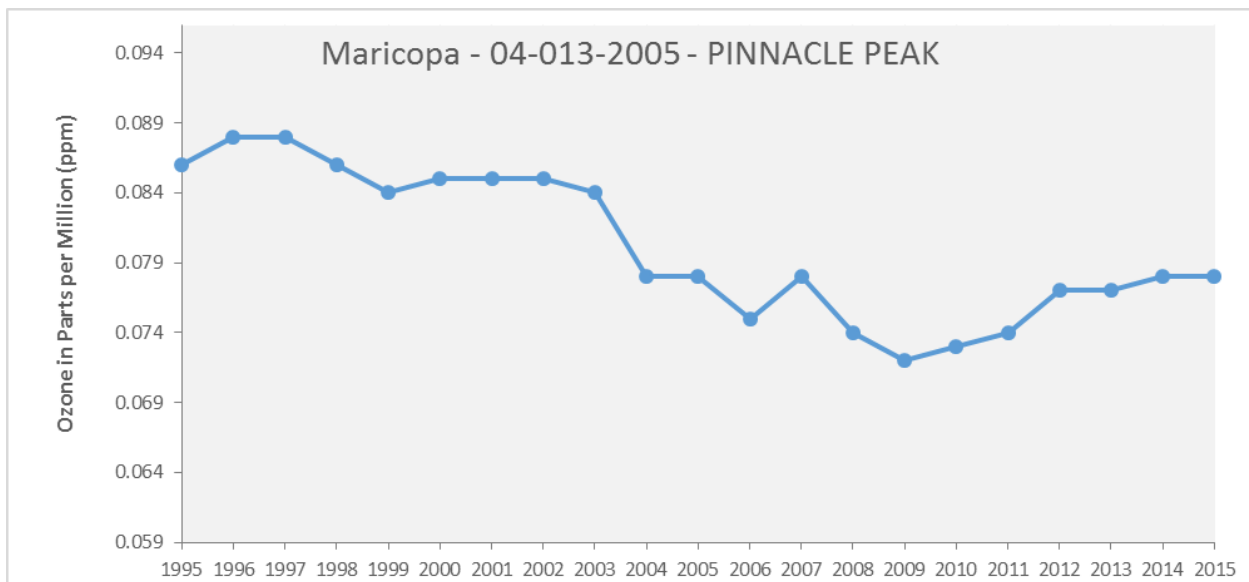


Figure 3-17 Pinal County Long-Term Design Value Trend

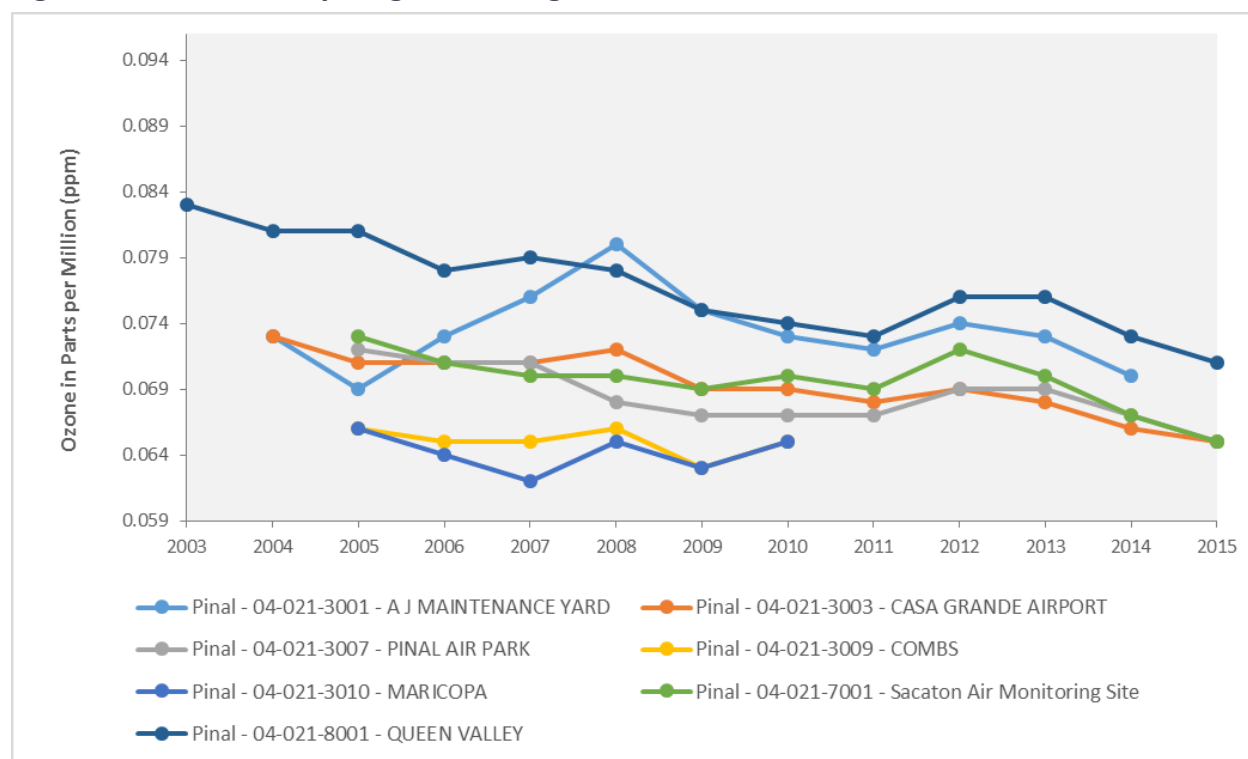
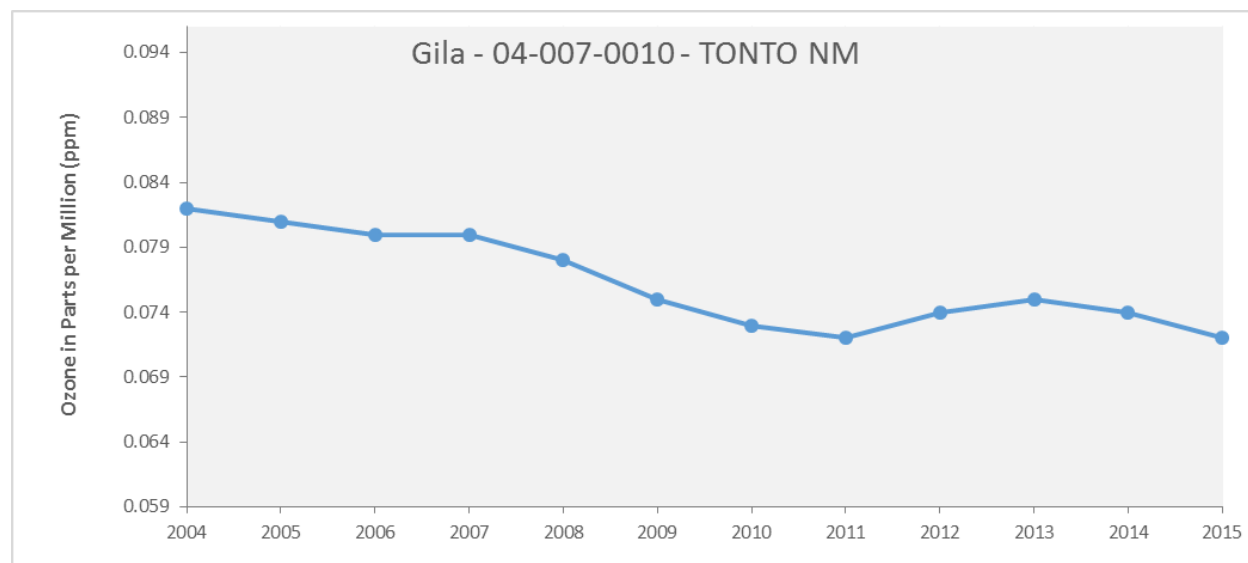


Figure 3-18 Gila County Long-Term Design Value Trend



3.4.2 Emissions and Emissions-Related Data

ADEQ evaluated emissions and emissions-related data from Maricopa, Pinal, and Gila Counties. [Table 3-4](#), [Table 3-5](#), [Table 3-6](#), and [Table 3-7](#) below represent the 2011 NEI emission data.

Table 3-4 County Level NO_x Emissions

NO _x Emissions (TPY)					
County	Point	Nonpoint	Onroad	Nonroad	County Total
Gila	338	399	1,329	340	2,406
Maricopa	4,684	8,274	56,748	18,738	88,443
Pinal	984	2,943	9,273	1,575	14,774
Multi-County Total	6,006	11,616	67,350	20,653	105,625

Table 3-5 County Level NO_x Emissions as Percentage of County Total

NO _x Emissions Approximate Percentage of County Total				
County	Point	Nonpoint	Onroad	Nonroad
Gila	14%	16.5%	55%	14%
Maricopa	5%	9.4%	64.2%	21.2%
Pinal	6.5%	20%	62.8%	10.6%
Multi-County	5.7%	11%	63.8%	19.6%

Table 3-6 County Level VOC Emissions

VOC Emissions (TPY)					
County	Point	Nonpoint	Onroad	Nonroad	County Total
Gila	110	108,389	758	2,255	111,512
Maricopa	1,150	244,022	25,659	15,839	286,670
Pinal	921	128,054	3,750	1,525	134,249
Multi-County Total	2,181	480,465	30,167	19,619	543,432

Table 3-7 County Level VOC Emissions as Percentage of County Total

VOC Emissions Approximate Percentage of County Total				
County	Point	Nonpoint	Onroad	Nonroad
Gila	0%	97.2%	55%	0.7%
Maricopa	0.4%	85.1%	9%	5.5%
Pinal	0.7%	95.4%	6.9%	1.1%
Multi-County	0.4%	88.4%	5.6%	3.6%

3.4.2.1 Point Source Data

See [Figure 3-19](#) and [Figure 3-20](#) for visual representations of NO_x and VOC emission sources, respectively, and shows the boundary for this data-contingent recommendation. These figures represent 2014 permitted point source data as reported by ADEQ, Maricopa County, and Pinal County, binned and displayed by actual emitted tons per year thresholds. . All of the sources within the 2008 Ozone nonattainment boundary, including all existing nearby fossil fuel electric generating stations, will be subject to RACT because of the involuntary higher reclassification as

a result of the area not attaining the 2008 standard by the marginal classification deadline.⁴² In Pinal County there are several small emitting sources. Pinal and Maricopa Counties both permit facilities down to one ton per year, ensuring that facilities are controlled.

Far away from the Phoenix center in Pinal County are a few mid-range emitting facilities. There are also a few mid-range point sources in Gila County that are not nearby. These sources are not located within the same CBSA as the Phoenix area. Given the lack of any other emissions activities in the areas of these mid-range point sources, the proportion of point source emissions in both Pinal and Gila compared to other emission values shown in [Table 3-5](#) and [Table 3-7](#) above does not support significant contribution of these point sources to the Phoenix area's nonattainment. Additionally, these mid-range sources are more market driven and do not have as much assured potential to constantly emit during ozone season like electric generating stations, which have high potentials for emissions during the hot Phoenix summer months because of greater temperature modulation usage (i.e. air conditioning, refrigerators, other cooling equipment). Generally, Arizona homes use about a quarter less energy than the national average, but one quarter of the energy consumed in Arizona homes is for electricity dependent air conditioning, which is four times the national average. This indicates that electric generating stations may typically be emitting more during the ozone season than any other time of the year. Existing fossil fuel electric generating stations are captured within the boundary and in the San Tan Valley near the Queen Valley monitor. ADEQ has additionally included a high NO_x potential facility permit applicant within this data-contingent recommendation.

Also, there are several controls that are already in place in the current Phoenix-Mesa 2008 Ozone Nonattainment area, and additional controls being put in place according to CTG guidelines on RACT sources. Area A,⁴³ an area first established by statute in 1988,⁴⁴ ensures that reformulated gas is used and that car emissions are controlled through a stringent vehicle emissions inspection program. See an image of the current Area A boundary in [Figure 3-21](#)

⁴² See *Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas for the 2008 Ozone NAAQS*, 81 FR 26697, 26699 (May 4, 2016).

⁴³ Area A has been modified and expanded several times over the years to include additional areas of Maricopa County, Yavapai County, and Pinal County, the latest revision being in 2001. House Bill 2538 Amending ARS § 49-541, Forty-fifth Legislature, First Regular Session, 2001, Chapter 371, § 8) available at <http://www.azleg.gov/legtext/45leg/lr/laws/0371.pdf>.

⁴⁴ The area has had controls since the 1970s because it was designated a nonattainment area in 1974. The legal definition of "Area A" was established and added to ARS § 41-2121 in the HB 2206 (Thirty-eighth Legislature, Second Regular Session, 1988, Chapter 252, § 13).

Figure 3-19 Permitted NOx Point Sources

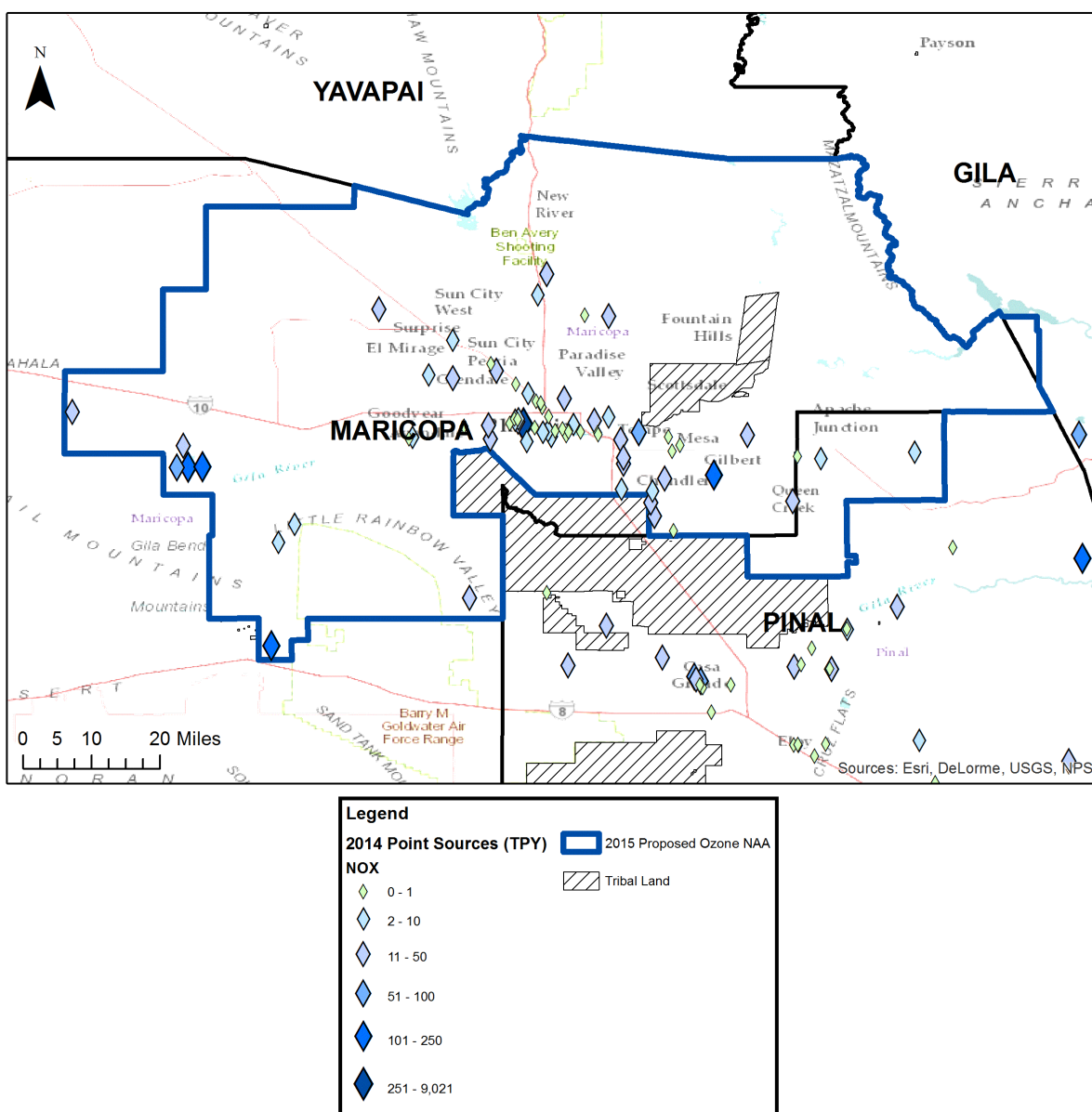


Figure 3-20 Permitted VOC Point Sources

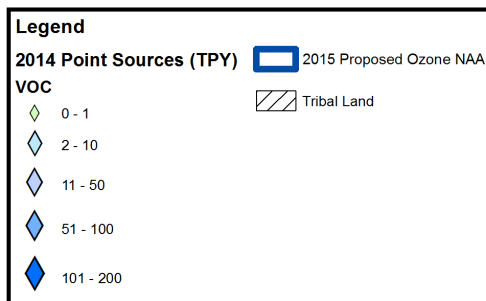
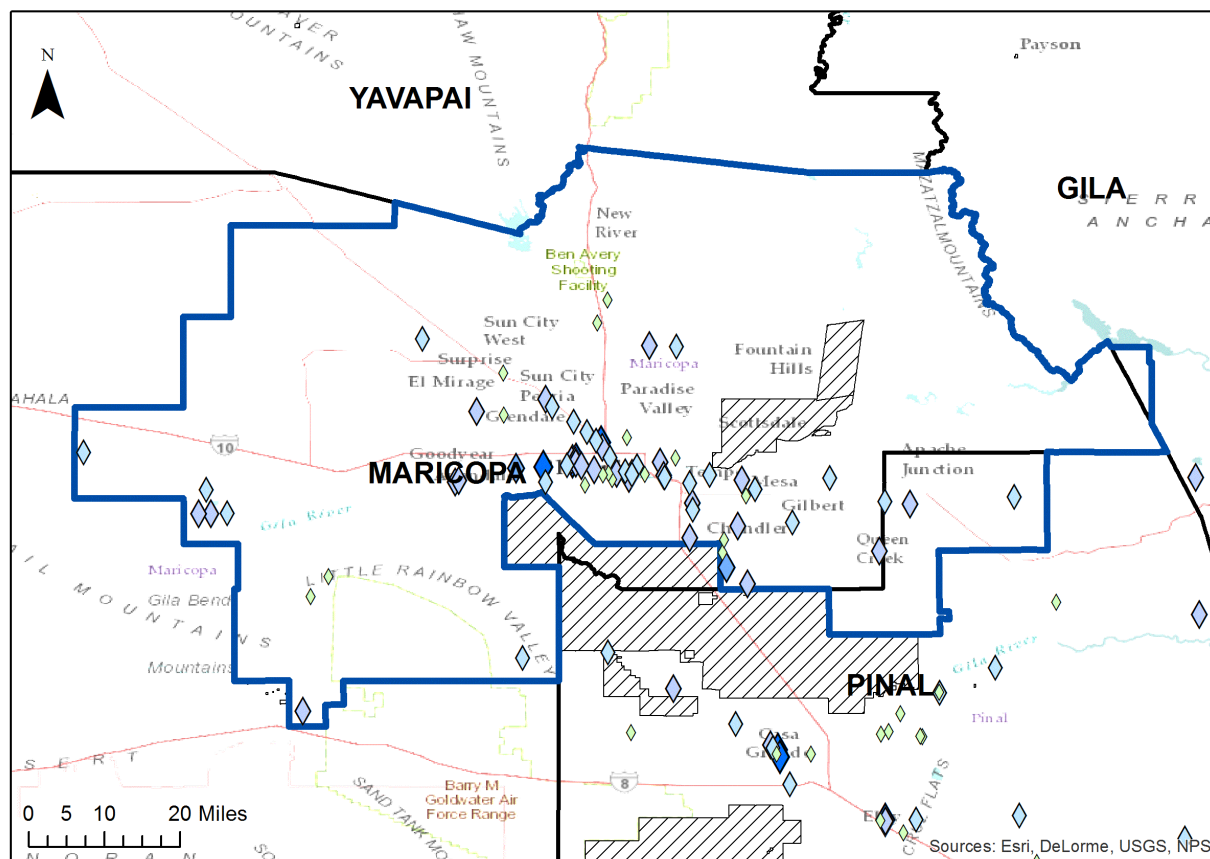
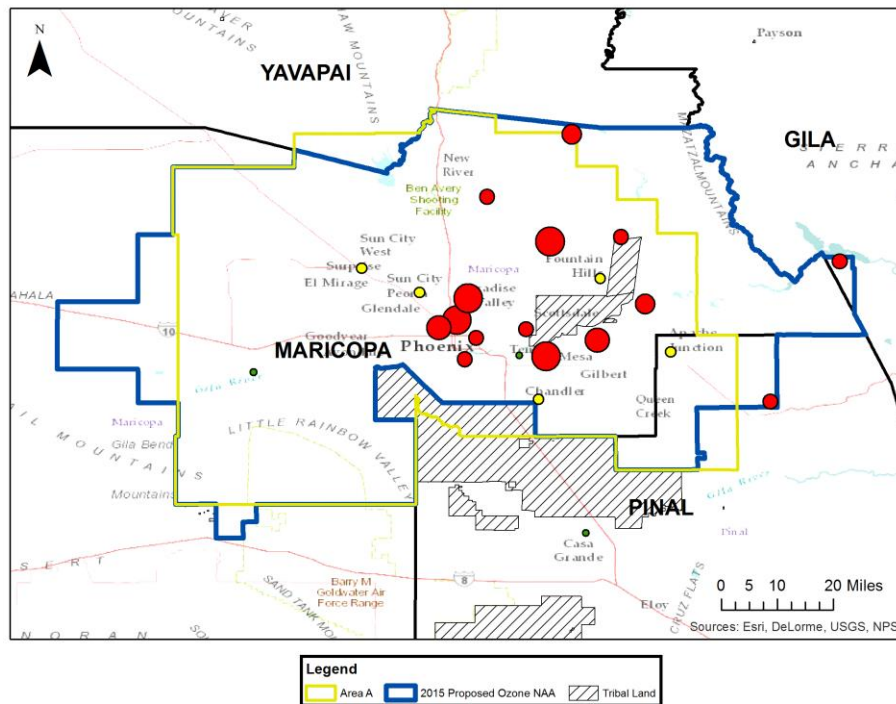


Figure 3-21 Area A Boundary in Maricopa and Pinal Counties



3.4.2.2 Traffic Data

Figure 3-22 below represents average annual daily traffic (AADT) in the Maricopa-Pinal-Gila area. According to the Arizona Department of Transportation, AADT is “the annualized average 24-hour volume of vehicles at a given point or section of highway is called a traffic count. It is normally calculated by determining the volume⁴⁵ of vehicles during a given period and dividing that number by the number of days in that period.”⁴⁶

Annual vehicle miles traveled (VMT) for the Phoenix-Scottsdale-Mesa CBSA (Maricopa and Pinal Counties combined) is 35,063,383,521 miles, according to 2014 HPMS data. The VMT for the Maricopa-Pinal-Gila recommended area is 31,334,133,501 miles. That means that 89% of annual VMT in the entire CBSA is captured by recommending this area.

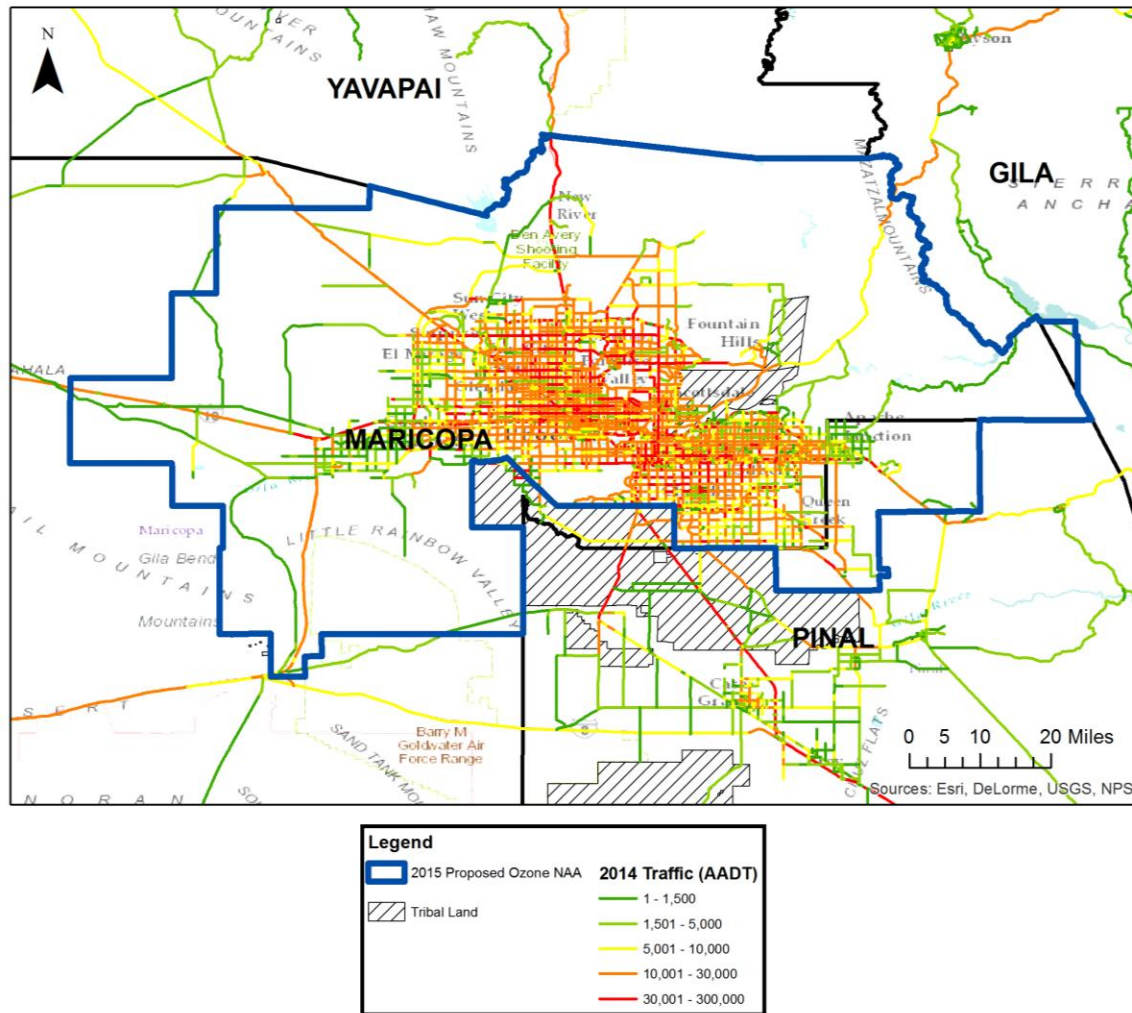
ADEQ also evaluated inter-county commuting flows in area. According to the U.S. Census 2009-2013 5-Year American Community Survey,⁴⁷ approximately 45% of surveyed Pinal County residents commute from Pinal to Maricopa County for work, specifically, 58,647 out of 128,950 commuters.

⁴⁵ i.e. bidirectional count

⁴⁶ Arizona Department of Transportation, *AADT Data Dictionary*, available at <https://www.azdot.gov/planning/DataandAnalysis> (last visited May 27, 2016).

⁴⁷ U.S. Census Bureau, *2009-2013 5-Year American Community Survey Commuting Flows, Table 1 County to County Commuting Flows*, available at <http://www.census.gov/hhes/commuting/> (last visited May 27, 2016).

Figure 3-22 Maricopa-Pinal-Gila Nonattainment Area Traffic



3.4.2.3 Population Data

EPA's Boundary Guidance asserts that population information can serve as a potential indicator of the probable location and magnitude of ozone emissions sources. ADEQ believes that this in combination with the other four factors, especially meteorology, may serve to inform areas that should be included in a nonattainment boundary. [Figure 3-23](#) and [Figure 3-24](#) below represents the change in population density in the Phoenix metropolitan area between the years 2000 and 2010, according to the U.S. Census. [Table 3-8](#), [Table 3-9](#), and [Table 3-10](#) below show the change in actual population between 2000 and 2010. [Table 3-11](#) also represent the change in population, or first survey of population, for particular Census Designated Places (CDPs) in areas in and near the Queen Valley ozone monitor in Pinal County. These CDP areas are shown in [Figure 3-25](#). San Tan Valley was not yet a CDP in 2000. 2010 was the first year that population was estimated for that particular area. The total 2010 population for the CBSA is 4,192,887 people, and the 2010 population for the Maricopa-Pinal-Gila area is 3,946,970 people. That means that approximately 94% of the CBSA population is contained within the recommended area.

Figure 3-23 Maricopa-Pinal-Gila Nonattainment Area 2000 Census Population Density

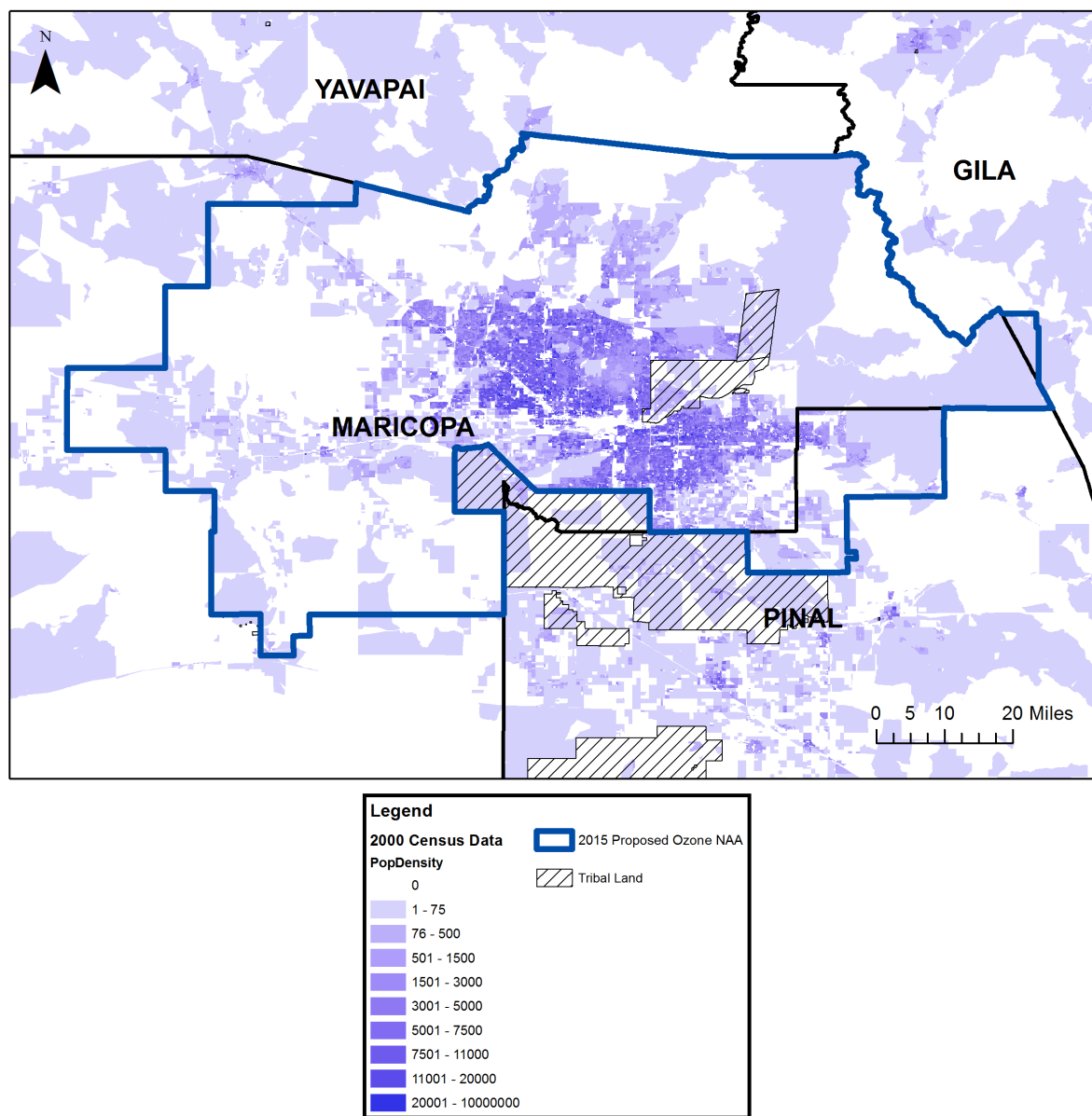


Figure 3-24 Maricopa-Pinal-Gila Nonattainment Area 2010 Census Population Density

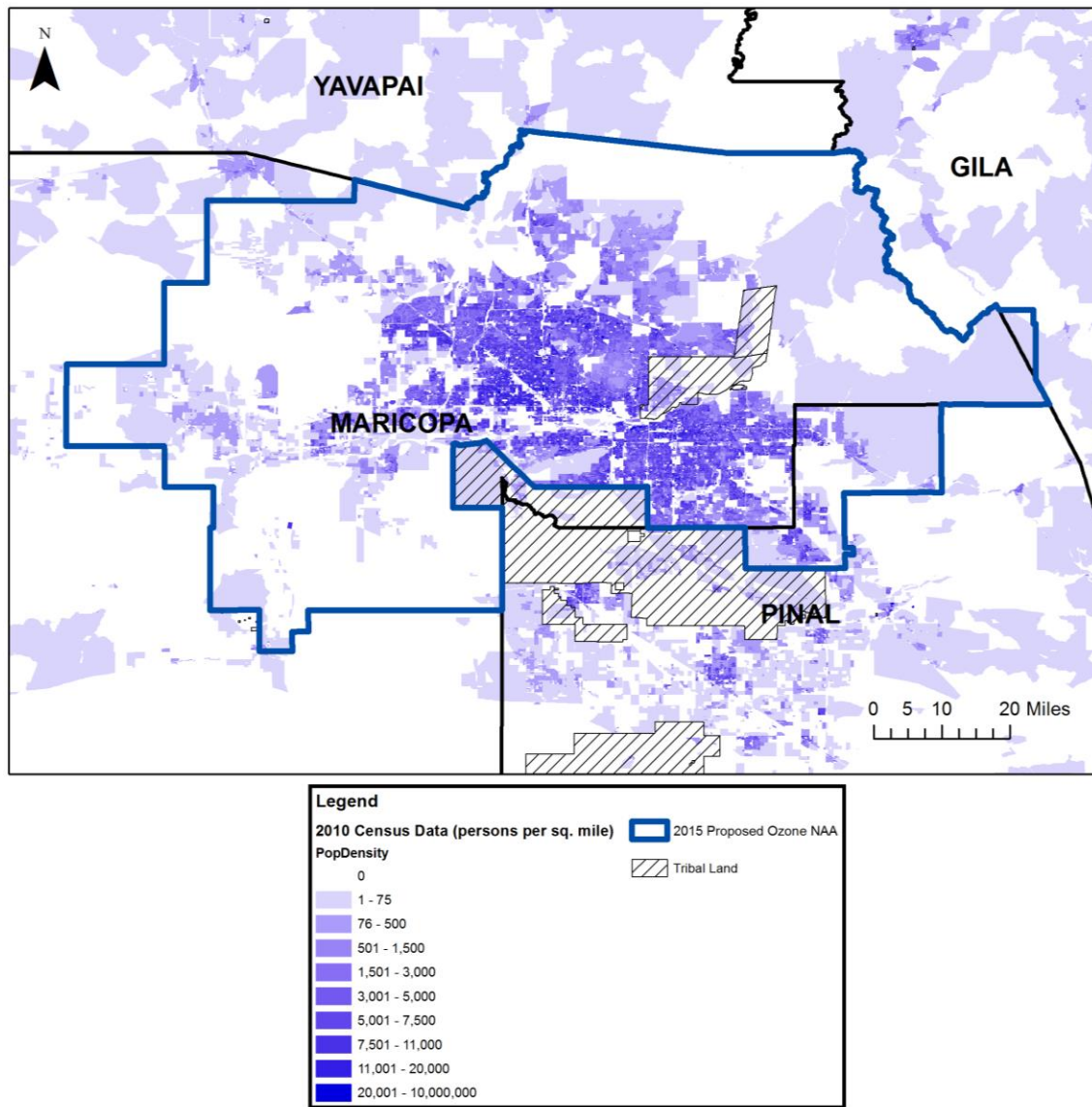


Table 3-8 Maricopa County Population Changes

County/Municipality	Census 2000	Census 2010	Population Growth (% increase)
Maricopa	3,072,149	3,817,117	24.2%
Apache Junction (part)	273	294	7.7%
Avondale	35,883	76,238	112.5%
Buckeye	6,537	50,876	678.3%
Carefree	2,927	3,363	14.9%
Cave Creek	3,728	5,015	34.5%

County/Municipality	Census 2000	Census 2010	Population Growth (% increase)
Chandler	176,581	236,123	33.7%
El Mirage	7,609	31,797	317.9%
Fountain Hills	20,235	22,489	11.1%
Gila Bend	1,980	1,922	-2.9%
Gilbert	109,697	208,453	90.0%
Glendale	218,812	226,721	3.6%
Goodyear	18,911	65,275	245.2%
Guadalupe	5,228	5,523	5.6%
Litchfield Park	3,810	5,476	43.7%
Mesa	396,375	439,041	10.8%
Paradise Valley	13,664	12,820	-6.2%
Peoria (part)	108,363	154,058	42.2%
Phoenix	1,321,045	1,445,632	9.4%
Queen Creek (part)	4,197	25,912	517.4%
Scottsdale	202,705	217,385	7.2%
Surprise	30,848	117,517	281.0%
Tempe	158,625	161,719	2.0%
Tolleson	4,974	6,545	31.6%
Wickenburg	5,082	6,363	25.2%
Youngtown	3,010	6,156	104.5%
Balance of Maricopa County	211,050	284,404	34.8%

Table 3-9 Pinal County Population Changes

County/Municipality	Census 2000	Census 2010	Population Growth (% increase)
Pinal	179,727	375,770	109.1%
Apache Junction (part)	31,541	35,546	12.7%
Casa Grande	25,224	48,571	92.6%
Coolidge	7,786	11,825	51.9%
Eloy	10,375	16,631	60.3%
Florence	17,054	25,536	49.7%
Kearny	2,249	1,950	-13.3%
Mammoth	1,762	1,426	-19.1%
Maricopa City ⁴⁸	(X)	43,482	--
Queen Creek (part)	119	449	277.3%
Superior	3,254	2,837	-12.8%
Winkelman (part)	4	0	-100.0%
Balance of Pinal County	78,737	187,517	138.2%

⁴⁸ Locality was formed or incorporated after Census 2000.

Table 3-10 Gila County Population Changes

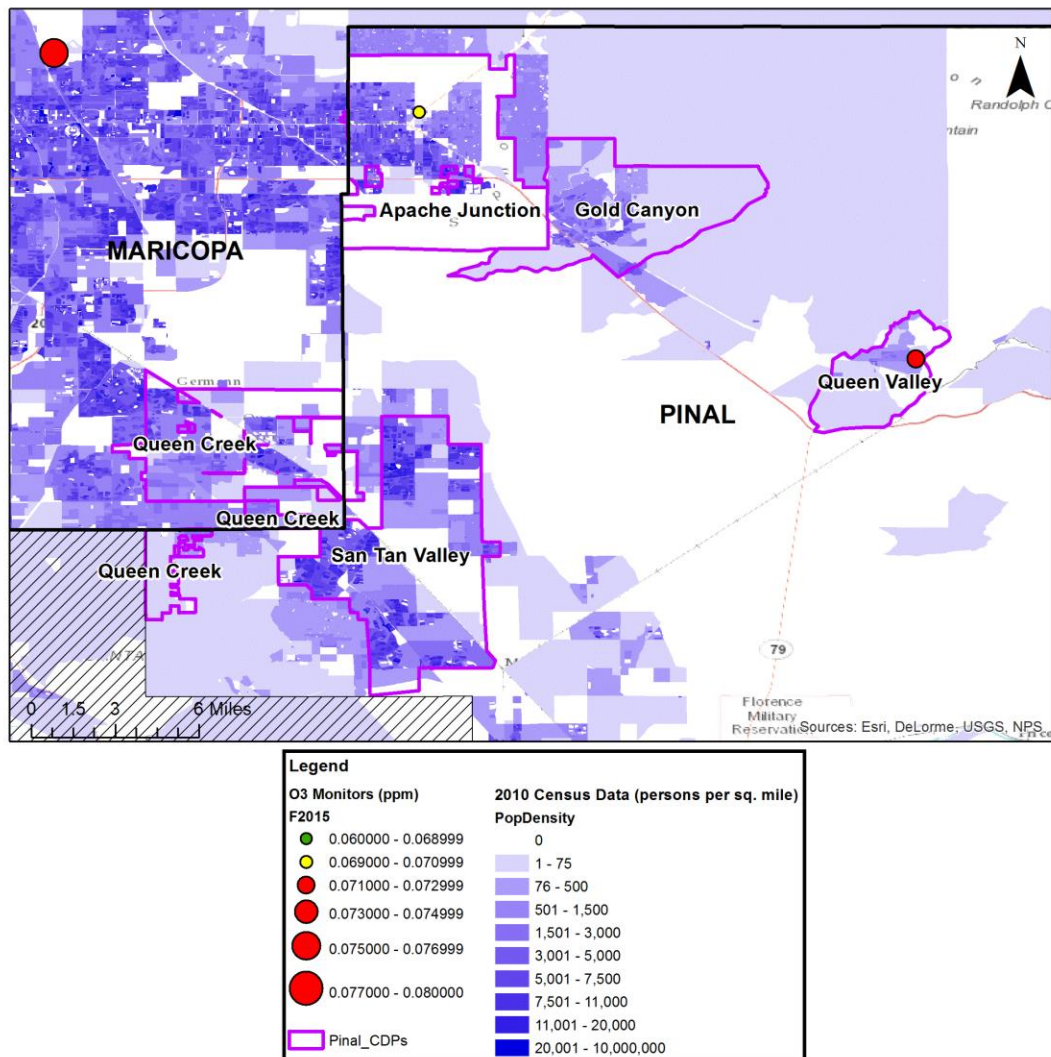
County/Municipality	Census 2000	Census 2010	Population Growth (% increase)
Gila	51,335	53,597	4.4%
Globe	7,486	7,532	0.6%
Hayden	892	662	-25.8%
Miami	1,936	1,837	-5.1%
Payson	13,620	15,301	12.3%
Star Valley ⁴⁹	(X)	2,310	--
Winkelman (part)	439	353	-19.6%
Balance of Gila County	24,940	25,602	2.7%

Table 3-11 Census Designated Places (CDPs) Population Changes

Area Name	2000 Population	2010 Population	% Growth
Pinal County Overall	179,727	375,770	109%
<i>Specific areas:</i>			
Queen Creek (total)	4,316	26,361	511%
Apache Junction	31,814	35,840	13%
Gold Canyon CDP	6,029	10,159	68.5%
Queen Valley CDP	820	788	-3.9%
San Tan Valley CDP	N/A	81,321	--

⁴⁹ Locality was formed or incorporated after Census 2000.

Figure 3-25 Census Designated Places of and near the Queen Valley Monitor



3.4.2.4 Transport and Background Data

In addition to the literature mentioned in [Section 2.3.2](#), the Atmospheric Chemistry and Physics Journal published a paper documenting a photochemical modeling study demonstrating transport from California.⁵⁰ Past observations and studies through aircraft observations, back trajectory analyses, and now photochemical transport modeling have indicated that tropospheric ozone is attributable to both Arizona anthropogenic emissions and regional transport. The study shows that Arizona emissions are a main contributor to hourly daytime concentrations in Phoenix in July, and that Southern California emissions transported to Phoenix can contribute hourly emissions between 10-40 ppb during the day.⁵¹ In addition, Southern California emissions can

⁵⁰J. Li et al., *Regional-scale Transport of Air Pollutants: Impacts of Southern California Emissions on Phoenix Ground-Level Ozone Concentrations*, 15 ATMOSPHERIC CHEMISTRY AND PHYSICS DISCUSSIONS 8361-8401 (2015), available at <http://www.atmos-chem-phys.net/15/9345/2015/acp-15-9345-2015.pdf>.

⁵¹ *Id.* at 8372.

increase daily 8-hour maxes in the Phoenix area by up to 32 ppb.⁵² While the contribution from California varies, it has the potential to be significantly in the Phoenix area.

3.4.3 Meteorology

Meteorological conditions play a critical role in the formation and distribution of ozone. Daytime in the Phoenix area is generally conducive to ozone formation because of the near constant heat and sun. Average high temperatures in the ozone season from April to October, range from about 85 to 105 degrees Fahrenheit, with highest temperatures occurring in July. [Table 3-12](#) below shows average temperatures and precipitation at the Phoenix Sky Harbor Airport location.

Table 3-12 Climate Summary at Phoenix Sky Harbor Location, AZ⁵³

Years 1933-2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max. Temp. (F)	66.2	70	76	84.5	93.7	103	105.7	103.6	99.1	88.3	75.3	66.5	86
Avg. Min. Temp. (F)	41.7	44.5	49.2	55.9	64.3	72.9	80.6	79.4	73.1	61	48.5	41.8	59.4
Avg. Total Precip. (in.)	0.78	0.76	0.84	0.28	0.13	0.09	0.86	1.02	0.68	0.57	0.55	0.9	7.46

Because of the abundance of sunlight and heat, higher 8-hour ozone concentrations generally begin around noon, with elevated 1-hour ozone concentrations measured well into the late afternoon, when ambient temperature and sunlight intensity are at their peak. Wind patterns in Phoenix suggest that ozone and ozone precursors can be transported in the morning from the far west and southern portions of the valley and impact monitors in the Phoenix valley. The NOX and VOC rich air mass can become photochemically active during the transport process and begin to produce ozone. When the air parcel finally drifts into the Phoenix metropolitan area, the NOX and VOC rich air can mix with the NOX and VOC rich Phoenix air, and depending on the conditions (i.e. sunlight, heat, VOC/NOX mixing ratios) ozone concentrations can begin to climb. Absent the photochemical process at night, or during cloud cover, ozone precursors can accumulate over time and when conditions are right, rapid ozone production can occur.

3.4.3.1 Maricopa County Representative Data

3.4.3.1.1 Wind Roses

[Figure 3-26](#) shows the location of the five selected representative ozone monitoring sites in Maricopa County for wind rose analysis. [Figure 3-27](#), [Figure 3-28](#), [Figure 3-29](#), [Figure 3-30](#), and [Figure 3-31](#) are wind roses showing the annual wind patterns at those selected sites in Maricopa County for 2013-2015.

⁵² *Id.* at 8379.

⁵³ WESTERN REGIONAL CLIMATE CENTER, *Phoenix Sky Harbor Int'l AP, Arizona (026481) Period of Record Monthly Climate summary, period of record 06/01/1933 to 01/20/2015*, <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?az6481> (last visited May 27, 2016).

Figure 3-26 Locations of Selected Wind Rose Sites

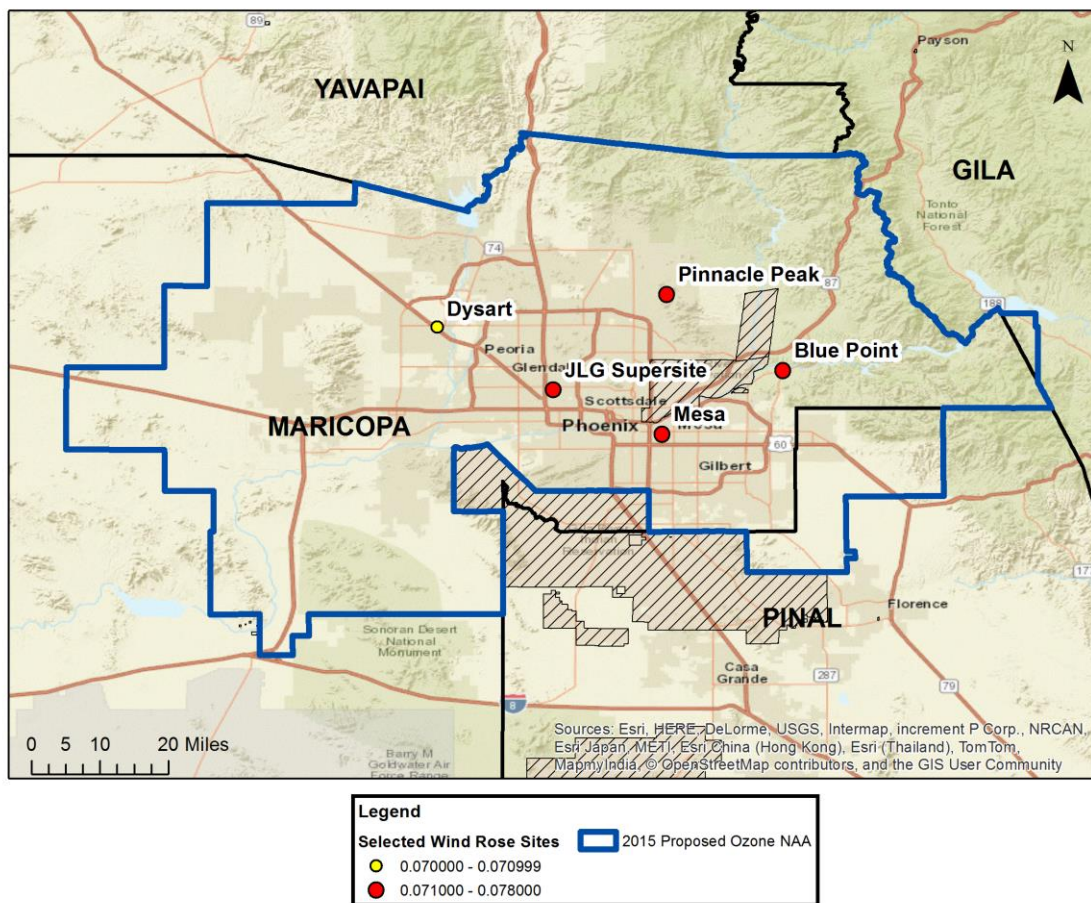


Figure 3-27 Blue Point Monitor – Annual Winds

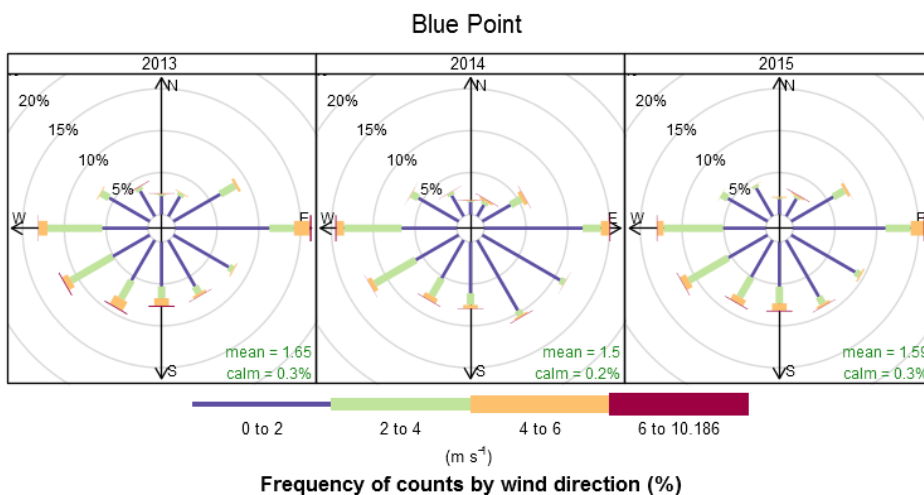


Figure 3-28 Dysart Monitor – Annual Winds

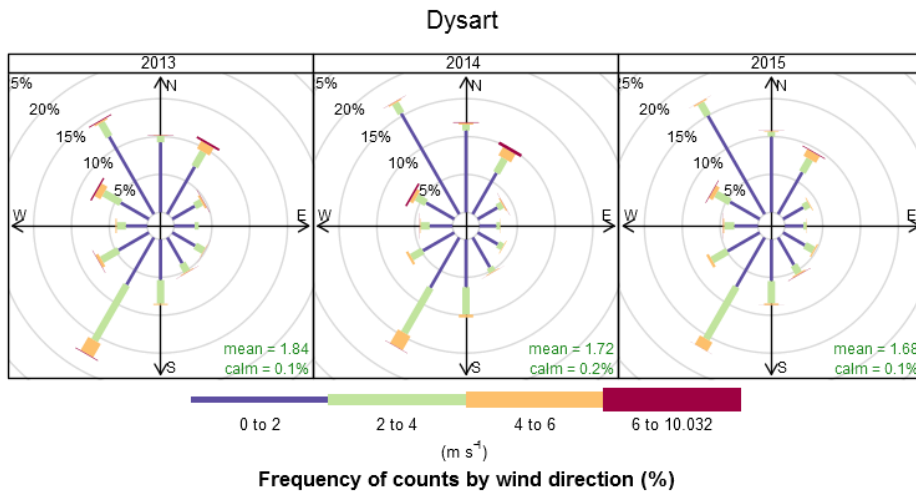


Figure 3-29 JLG Supersite Monitor – Annual Winds

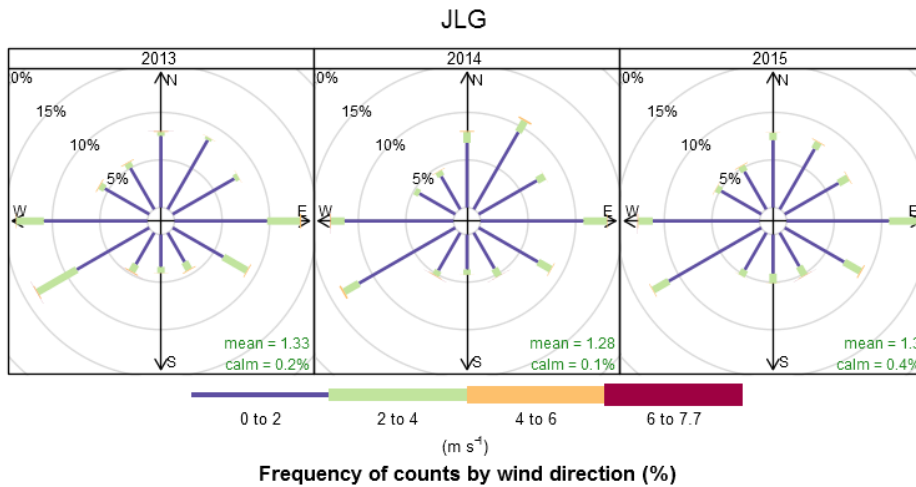


Figure 3-30 Mesa Monitor – Annual Winds

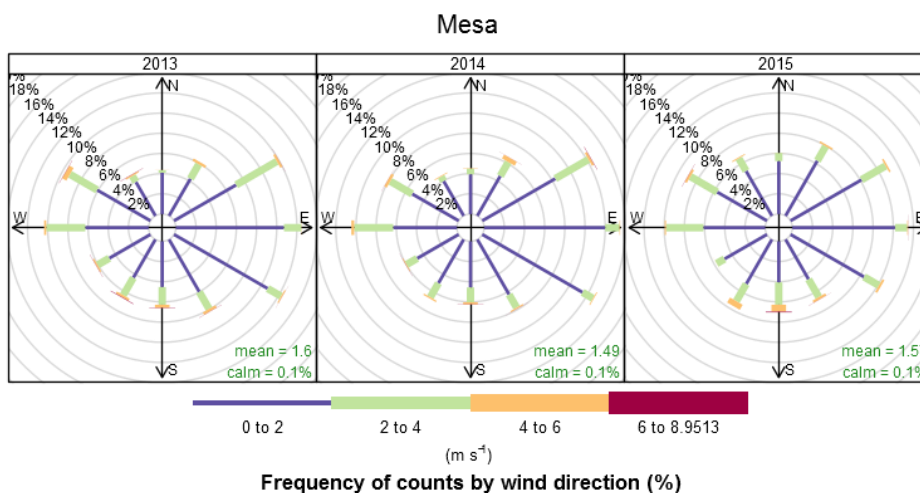


Figure 3-31 Pinnacle Peak Monitor – Annual Winds

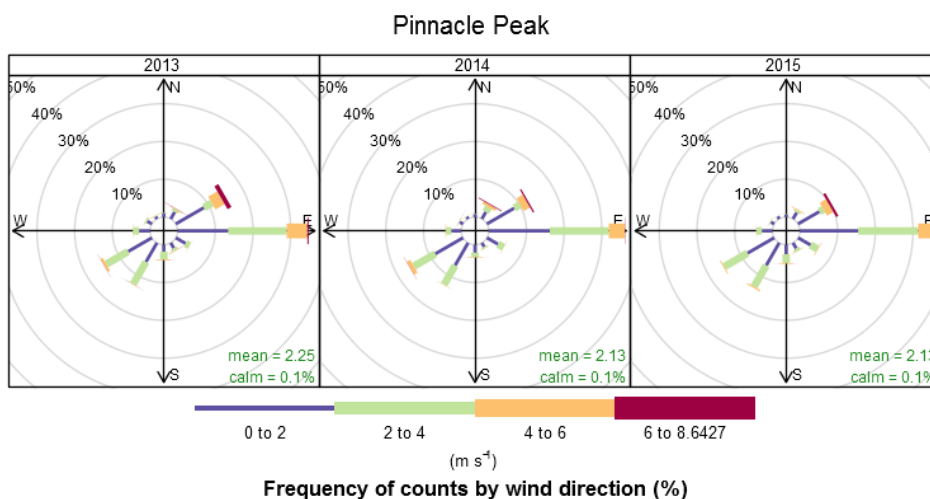


Figure 3-32, Figure 3-33, Figure 3-34, and Figure 3-35 are wind roses showing 24 hour wind patterns for the 10 highest ozone concentration days in 2013-2015 at selected representative ozone monitoring sites in Maricopa County.

Figure 3-32 Blue Point Monitor – 10 Highest Ozone Concentration Day Winds

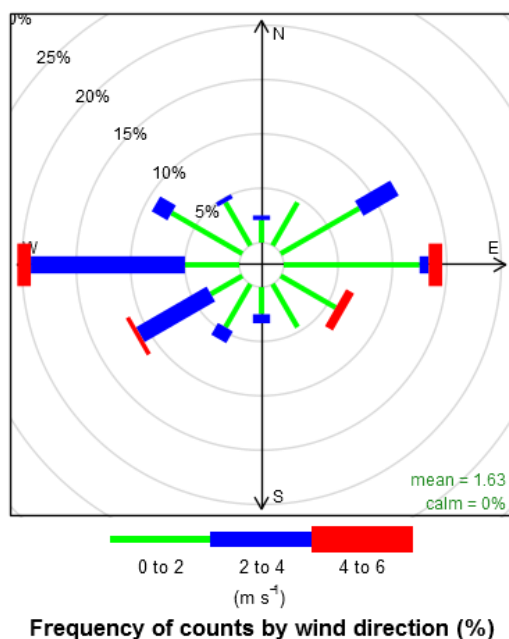


Figure 3-33 JLG Supersite Monitor – 10 Highest Ozone Concentration Day Winds

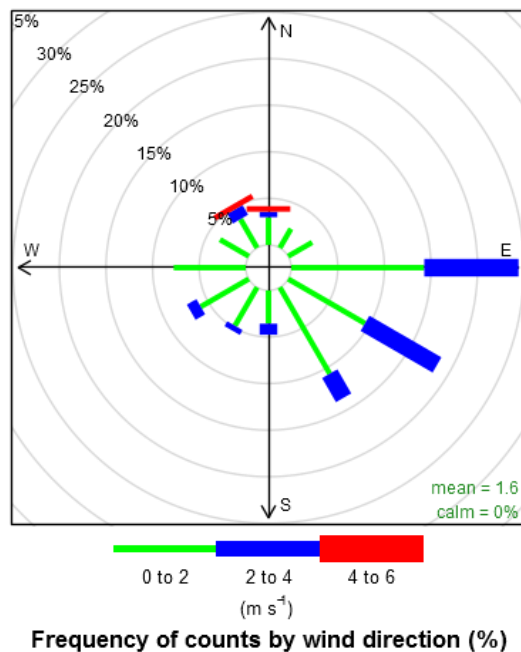


Figure 3-34 Mesa Monitor – 10 Highest Ozone Concentration Day Winds

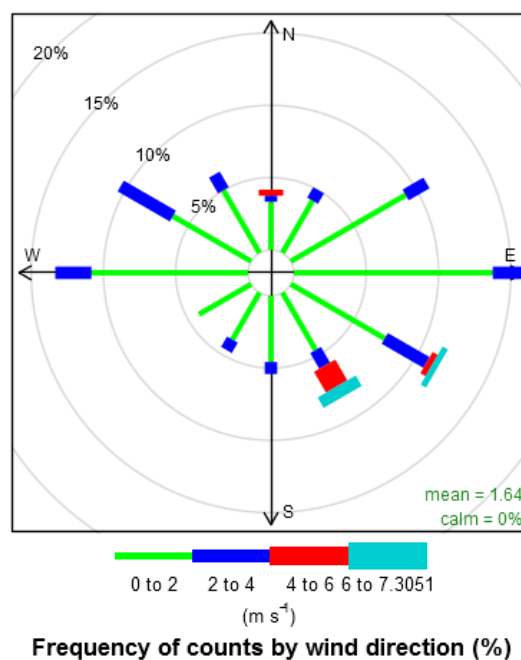
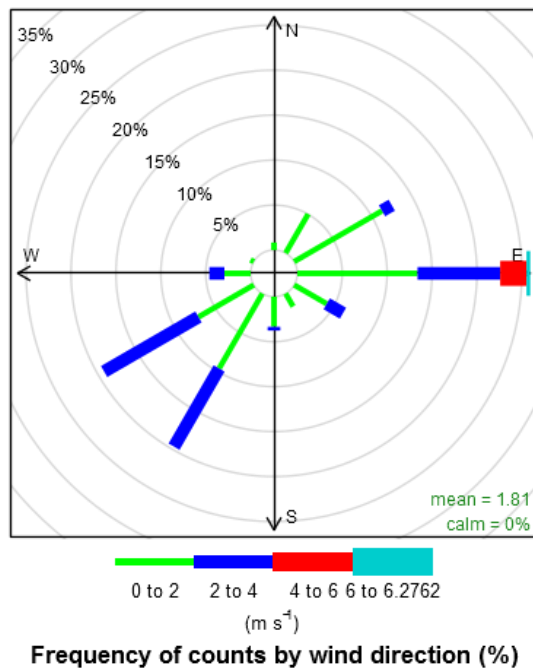


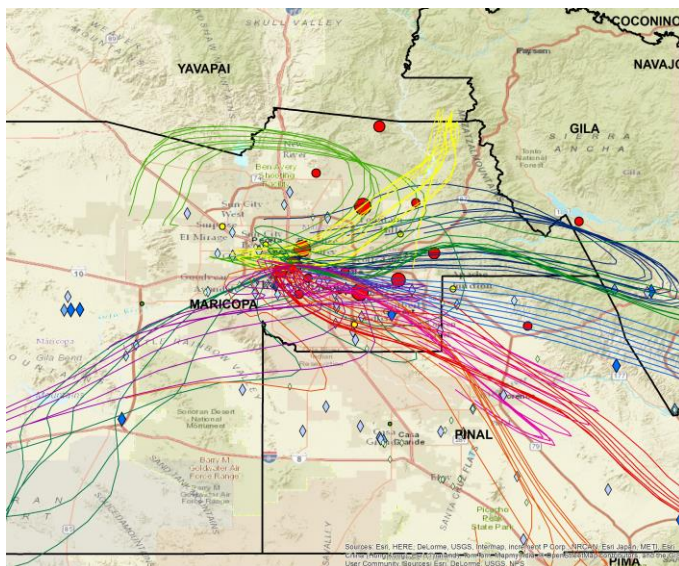
Figure 3-35 Pinnacle Peak Monitor – 10 Highest Ozone Concentration Day Winds



3.4.3.1.2 HYSPLITs

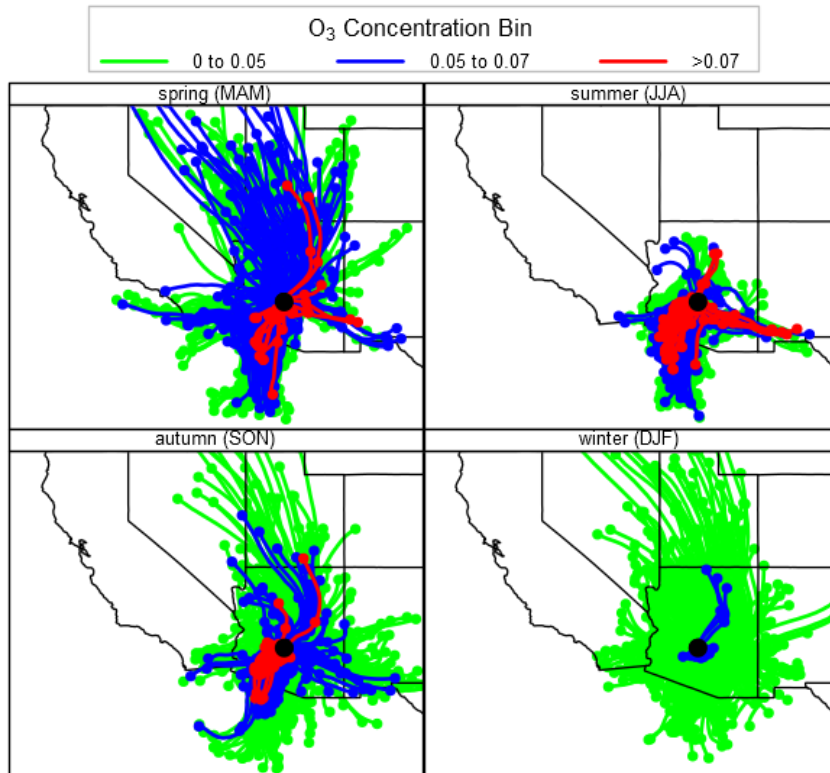
Pictured in [Figure 3-36](#) below are 24 hour HYSPLIT trajectories to the ADEQ operated JLG Supersite. The images reflect a back trajectory for each hour in the 8 hour exceedance day average for the 10 highest ozone concentration days between 2013 and 2015. For methodologies and additional HYSPLIT model results please see Appendix A, section 3 and Exhibit A1, Section 14.

Figure 3-36 JLG Supersite – 10 Highest Days HYSPLIT Back Trajectories



[Figure 3-37](#) below is a diagram representing HYSPLIT 24 hour back trajectories. A trajectory is drawn to represent every third hour in a two year period (2013-2014),⁵⁴ and color-coded by concentration. The image is provided in order to give an overall contextual picture of modeled incoming meteorology over the course of a year.

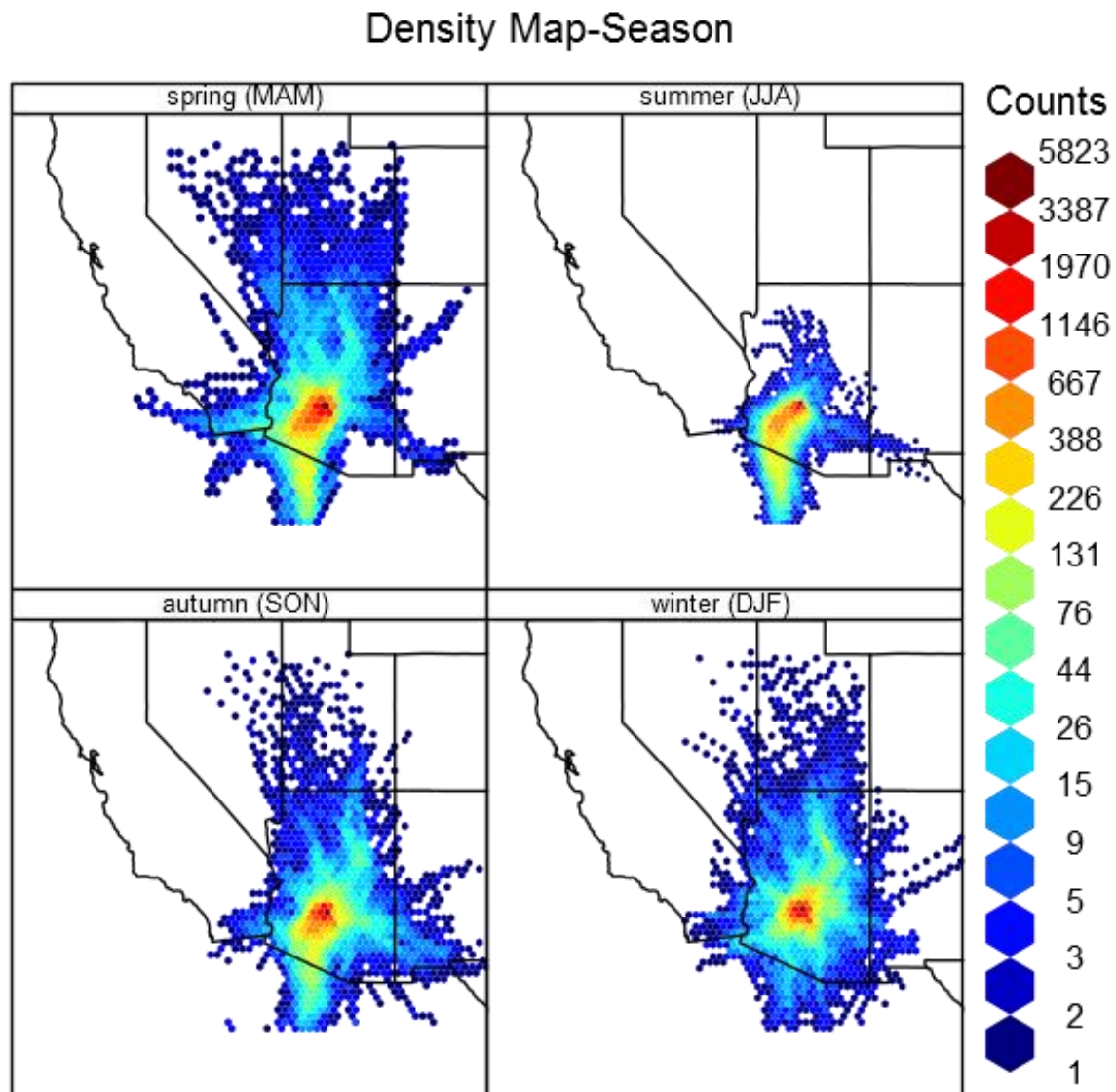
Figure 3-37 JLG Supersite Seasonal Ozone Concentration Specific HYSPLIT Trajectory Map



In [Figure 3-38](#) below, see a back-trajectory density analysis showing how frequently modeled wind trajectories passed through gridded area sections on their way to the JLG Supersite monitor between 2013 and 2014. A 24 hour trajectory is drawn to represent every third hour in a two year period (2013-2014)

⁵⁴ i.e. Eight trajectories are drawn in a day.

Figure 3-38 JLG Supersite Seasonal HYSPLIT Density Map

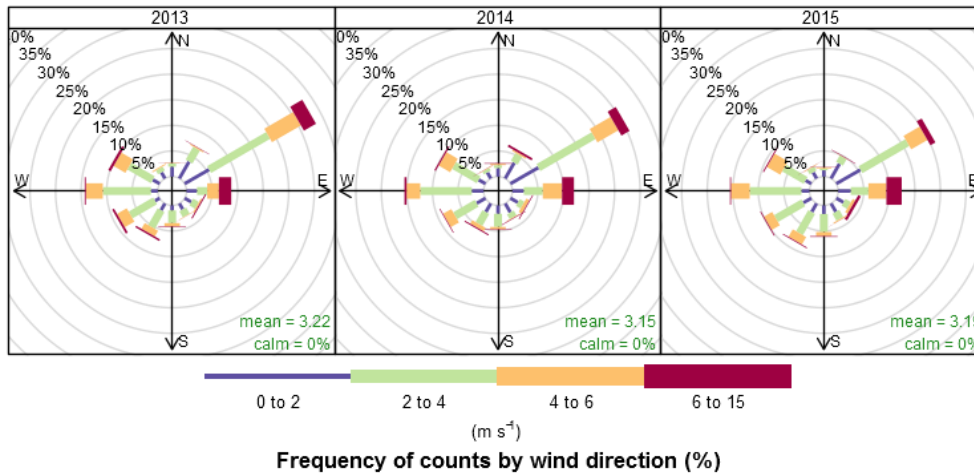


3.4.3.2 Pinal County's Queen Valley and San Tan Representative Data

3.4.3.2.1 Wind Roses

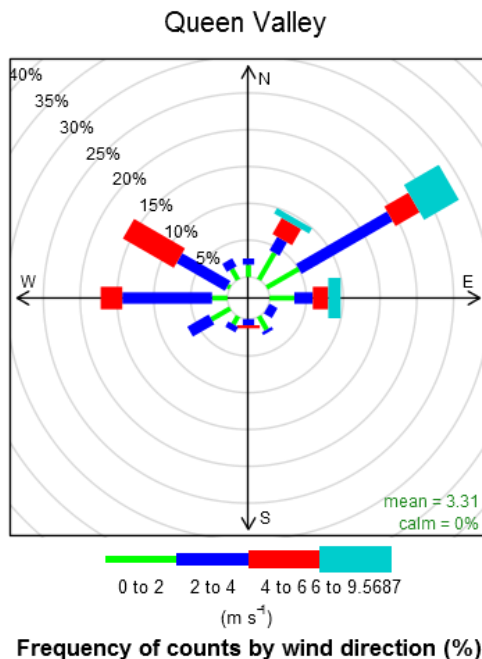
[Figure 3-39](#) shows wind roses for the annual wind patterns at the Queen Valley monitor for 2013-2015.

Figure 3-39 Queen Valley Monitor – Annual Winds



[Figure 3-40](#) is a wind rose showing 24 hour wind patterns for the 10 highest days in 2013-2015 at the Queen Valley monitor.

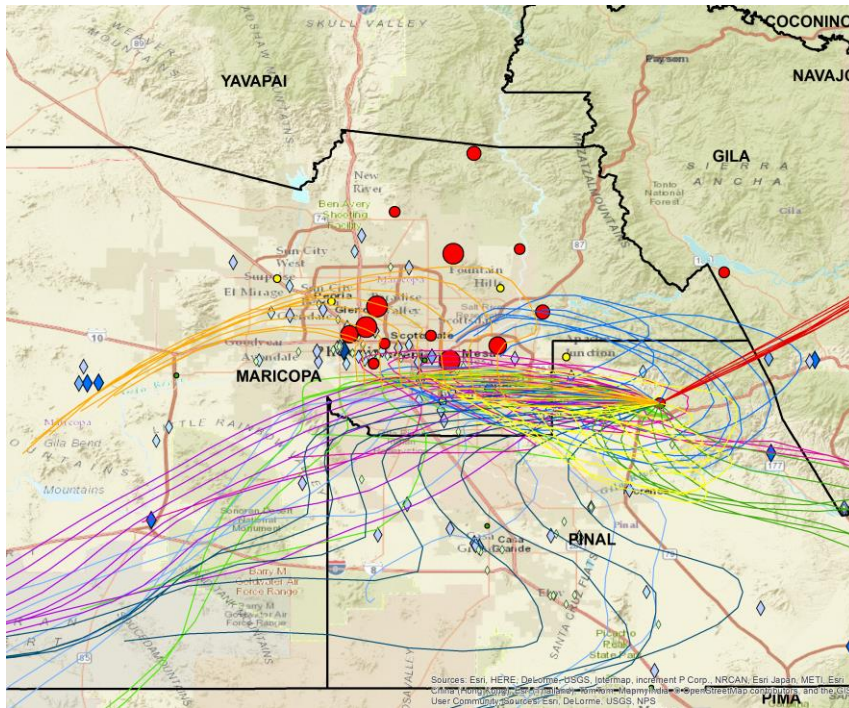
Figure 3-40 Queen Valley Monitor – 10 Highest Ozone Concentration Day Winds



3.4.3.2.2 HYSPLITs

Pictured in [Figure 3-41](#) below are 24 hour HYSPLIT trajectories to the Queen Valley ozone monitor in Pinal County. The images reflect a trajectory for each hour in the 8-hour exceedances for the 10 highest ozone concentration days during 2013-2015. For methodology and additional HYSPLIT model results please see Appendix A, Section 3 and Exhibit A1, Section 15.

Figure 3-41 Queen Valley – 10 Highest Ozone Concentration Days HYSPLIT Back Trajectories



3.4.3.2.3 Diurnal Analysis

ADEQ staff conducted a diurnal wind pattern analysis for the Queen Valley monitor, to determine where the emissions are likely transported from during exceeding hours. The HYSPLITs indicate that emissions are likely from the Maricopa County area of Phoenix and the nearby San Tan Valley. Looking at wind roses for the 10 highest days at Queen Valley, staff suspected that mountain valley wind patterns were the cause of the high percentage of eastern winds, shown on the above wind roses (See [Figure 3-39](#) and [Figure 3-40](#)). ADEQ further analyzed diurnal wind patterns on the 10 highest ozone concentration days for 2013-2015 and found that during the exceedance hours (between 10:00 a.m. and 8:00 p.m.), winds are generally westerly. See [Figure 3-42](#), [Figure 3-43](#), and [Figure 3-44](#) below:

Figure 3-42 Diurnal Wind Pattern for 10 Highest Ozone Concentration Days at Queen Valley

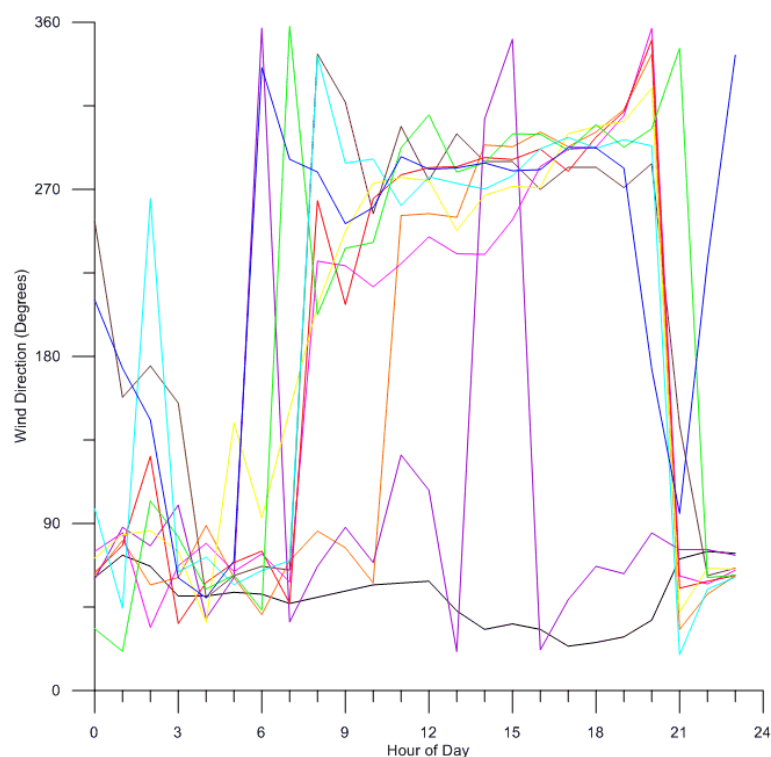


Figure 3-43 Average Diurnal Wind Pattern for 10 Highest Ozone Days at Queen Valley

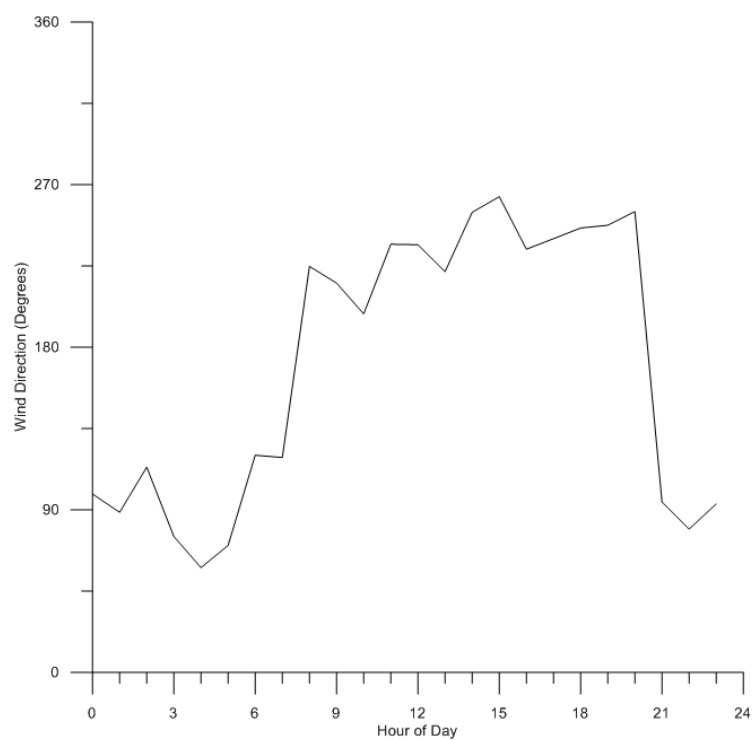
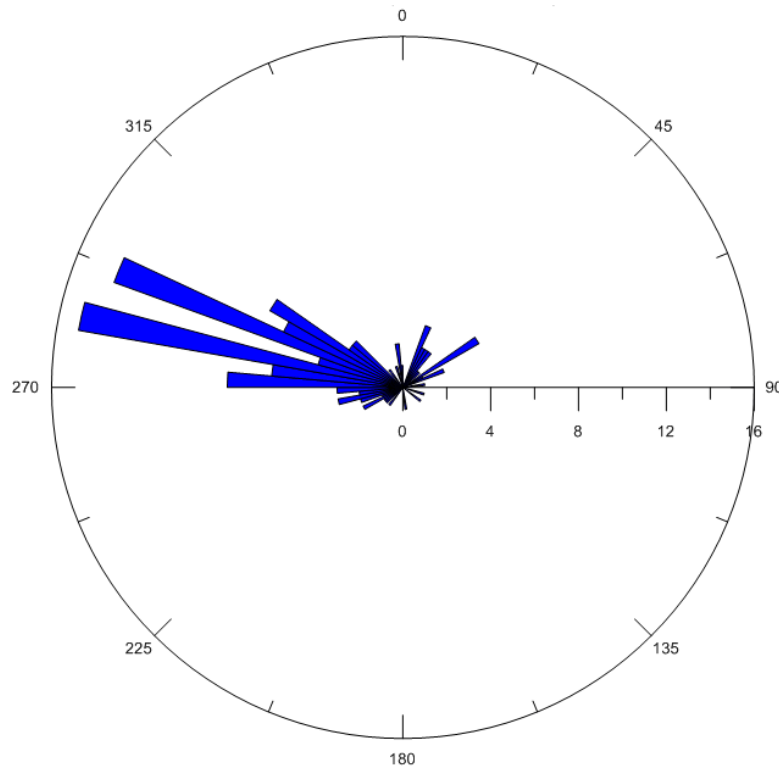


Figure 3-44 Queen Valley 10 am to 8pm 10 Highest Ozone Days Wind Directions



3.4.3.3 Gila County's Tonto National Monument Representative Data

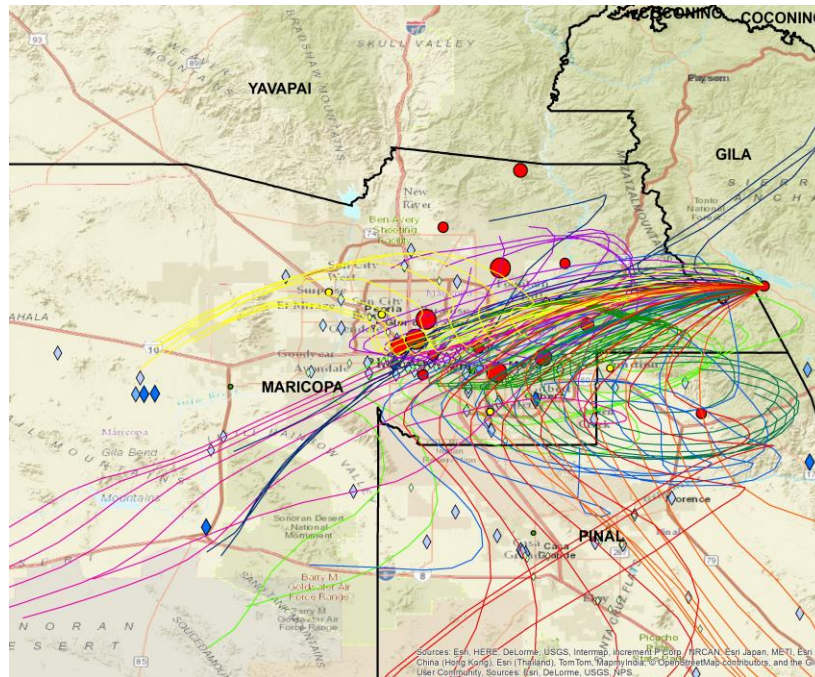
3.4.3.3.1 Wind Roses

There is no meteorological station located at the Tonto National Monument ozone monitor in Gila County. ADEQ considered reviewing meteorological data at the Blue Point ozone monitor as a surrogate for weather information at the Tonto National Monument monitor, but concluded that Blue Point data is likely not representative enough considering the distance from the Gila monitor and the difference in topography.

3.4.3.3.2 HYSPLITs

Pictured in [Figure 3-45](#) are 24 hour HYSPLIT back trajectories from the Tonto National Monument ozone monitor in Gila County. The images reflect a trajectory for each hour in the 8 hour exceedances for the 10 highest ozone concentration days during 2013-2015. For methodology and additional HYSPLIT model results please see Appendix A, Section 3 and Exhibit A1, Section 1.

Figure 3-45 Tonto National Monument – 10 Highest Ozone Days HYSPLIT Back Trajectories



3.4.4 Topography

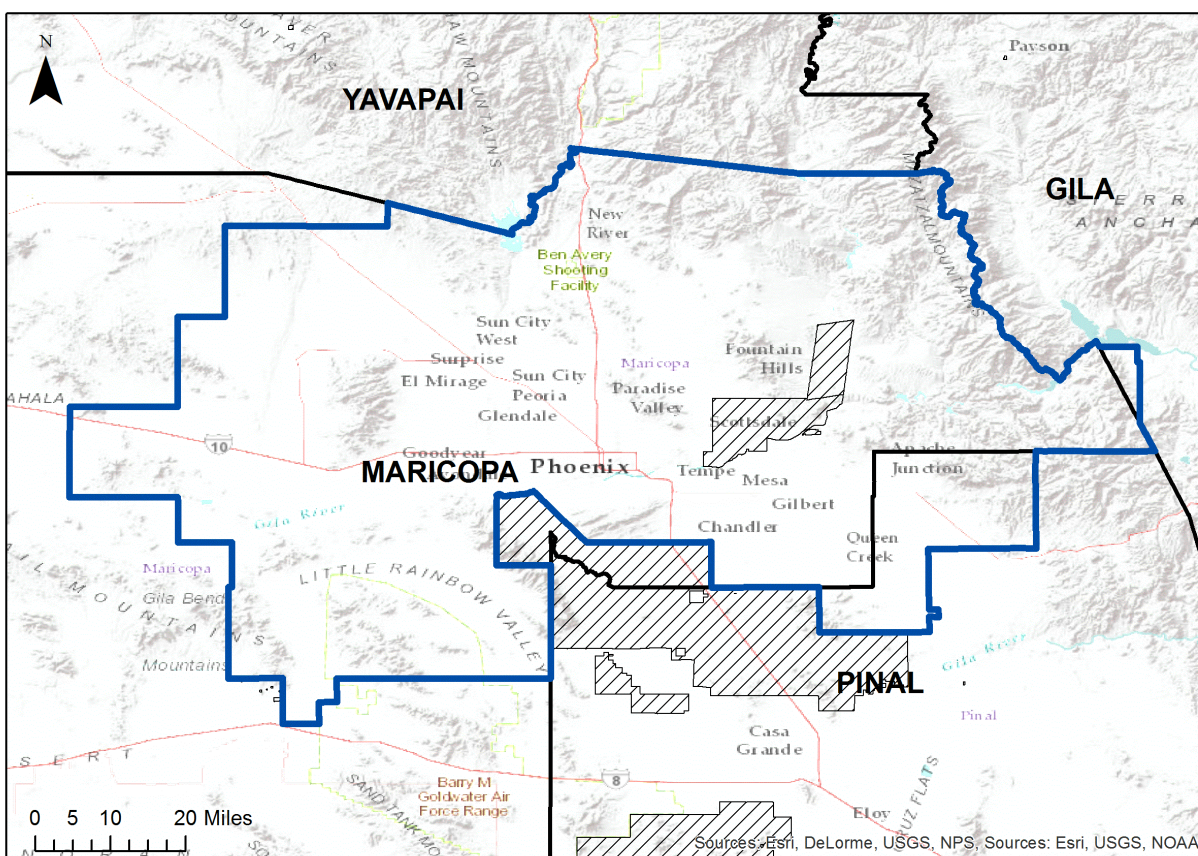
Although in the broad and mostly flat Salt River Valley, metropolitan Phoenix lies close to mountainous, complex terrain. The valley is bordered by several mountain chains including: the Mazatzal and Superstition Mountains to the east, the New River Mountains to the north and northeast, the Hieroglyphic Mountains to the northwest near Lake Pleasant, the White Tank Mountains in the west, the Estrella Mountains to the southwest, and the South Mountains to the south. Elevations range from about 1000 feet above sea level near downtown Phoenix to nearly 8000 feet along the Maricopa County border with Gila County and Yavapai County. This higher terrain, located to the north and east, generally forms a natural boundary between the Salt River Valley and complex terrain beyond the County border.

Because Phoenix lies within a valley, a typical mountain-valley diurnal wind pattern takes place. Hence, in the absence of major storm fronts, topography dictates the strength and direction of surface winds and drives the diurnal wind shift and flow. Eastern Maricopa County typically receives the Phoenix urban plume because of the prevailing late daytime and early evening valley-to-mountain surface winds out of the southwest. Absent any overriding weather pattern, winds typically start out from the east in the morning, become near calm around noon, and shift out of the southwest and west during the afternoon. On days where there is a thermal low situated over Baja, the afternoon southwest flow may have enough momentum to push the ozone plume up and over the mountains to the east, triggering exceedances at the Tonto National Monument monitor in Gila County. When there is little influence from the thermal low, these afternoon westerly (out of the west) winds may not have the momentum to get over the mountains, and thus fall back down to the west. This is often evident by a secondary spike at several locations late at night or early morning the next day. For example, ozone levels at the Rio

Verde monitor may increase steadily throughout the day, peaking late in the afternoon. At this point, concentrations at the monitor may begin to decrease until the air parcel reaches the mountains and sloshes back to cause a concentration spike in the late evening or early the next morning. This slosh effect has been discussed in a paper entitled *A Case Study of the Climatic Mechanisms Contributing to the Transport of Lower Atmospheric Ozone Across Metropolitan Phoenix, Arizona, USA* (Ellis, Hilenbrandt, Thomas, Fernando 1999).

For an overall picture of the topography in the Phoenix area, see [Figure 3-46](#) below:

Figure 3-46 Phoenix Metropolitan Area Topography



3.4.5 Jurisdiction

Generally, ADEQ has air quality planning authority for Pinal and Gila Counties (except for tribal land). Maricopa Association of Governments (MAG) has air quality planning authority for Maricopa County (except for tribal land). See [Figure 3-47](#) for locations of tribal land and MPO jurisdiction. Per A.R.S. § 49-406(A), and upon certification by Governor Ducey, MAG will have air quality planning authority for any future Phoenix 2015 ozone nonattainment area, as any likely nonattainment area would include Maricopa County and any additional areas in Pinal County for which MAG has transportation planning authority. There is no MPO that has transportation planning authority in the immediate area surrounding the Gila County ozone monitor, and ADEQ's interpretation of A.R.S. § 49-406 is that given a certification by the governor, MAG could

assume air quality planning authority over the entire 2015 Ozone Nonattainment area, including in the small area in Gila County with no applicable MPO.

While many of the monitors in the city lay on private or state land, five of the monitors in the Phoenix area are located adjacent to or on Tonto National Forest land. See [Figure 3-48](#) for land ownership.

Figure 3-47 Phoenix Metropolitan Area Tribal Land and MPO Jurisdiction

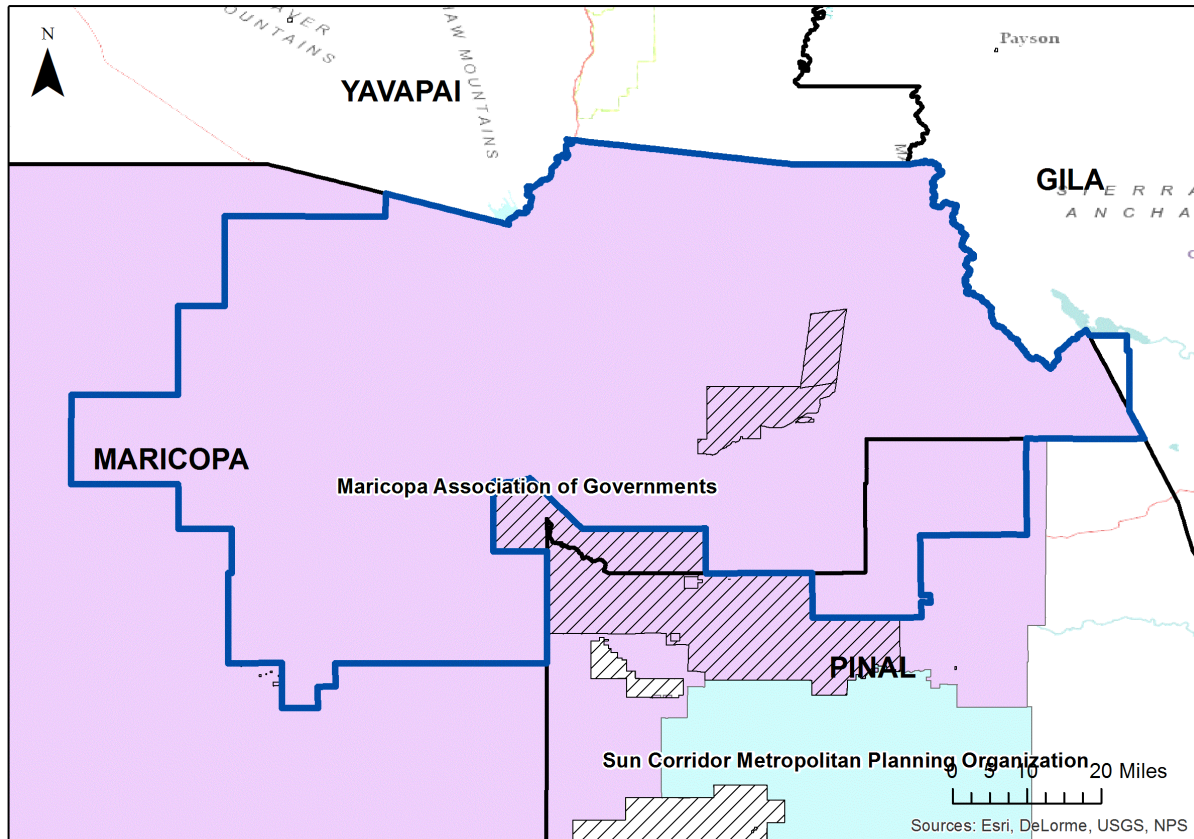
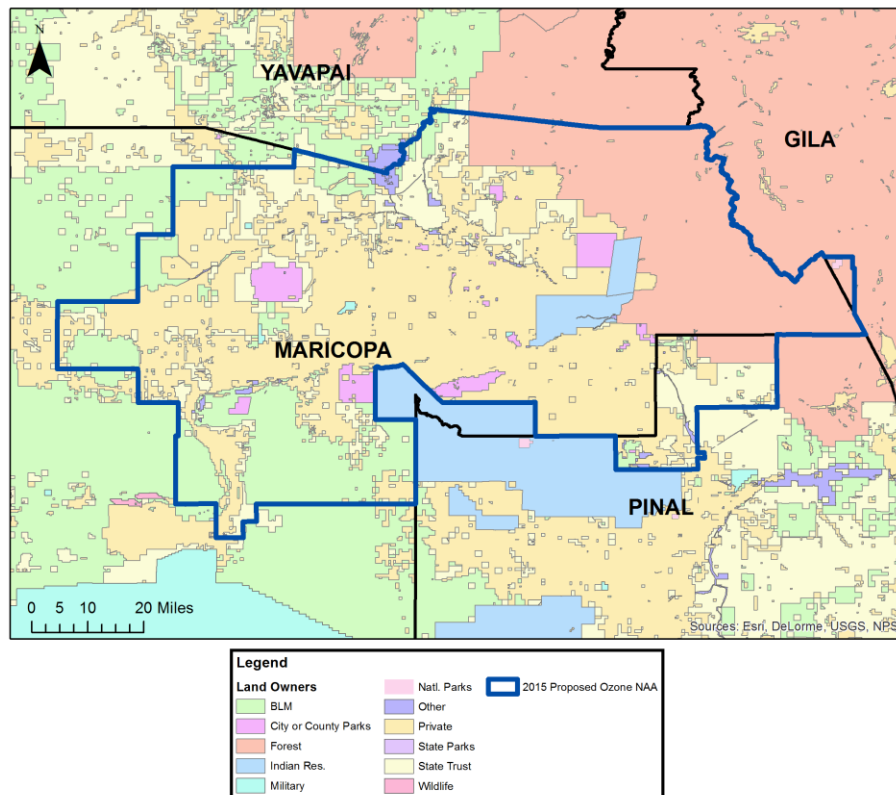


Figure 3-48 Phoenix Metropolitan Area Land Ownership



3.4.6 Weight of Evidence Analysis and Recommendation Summary

First, ADEQ is generally relying on its analysis for the 2008 ozone nonattainment area boundary as a basis for this recommendation. After review of all of the data, ADEQ generally finds the analysis is valid and sound.

However, given 2015 design values and the data presented, there are likely impacts from the Phoenix area to monitors outside of the 2008 boundary, namely the Tonto National Monument monitor in Gila County and the Queen Valley monitor in Pinal County. Concentrations at these monitors, like all monitors in the area, have been trending down in the long term, indicating improving air quality. However, neither of these monitors are currently attaining the new 2015 ozone NAAQS according to 2015 design value data. Therefore, in this data-contingent recommendation ADEQ includes the Queen Valley monitor and the Gila monitor.

While monitor concentrations have trended downward and the Phoenix area is partly impacted by transported emissions, the Phoenix area largely impacts its own nonattainment for the new 2015 standard. It should be noted, however, that point sources are highly accounted for and controlled in both Maricopa and Pinal Counties. Facilities are permitted down to a ton. The existing 2008 Phoenix-Mesa Ozone Nonattainment Area is implementing RACT on point sources. Also, Area A, an area encompassed mostly by the 2008 nonattainment area and extending into Pinal County, already implements reformulated gas and is mandated to participate in the vehicle

emissions inspection program. ADEQ's Ozone Transport I-SIP submission contained a list of many of the controls that apply in the Phoenix area.

Overall, the Phoenix area has become more densely populated within the 2008 boundary and in some areas outside of the 2008 boundary. Despite population growth ozone has been decreasing overall due to continuous measures and potential fleet turnover within the metropolitan area. However, population, along with its associated activity and data, is still a distinct indicator and projection factor for emissions inventories (such as Maricopa County's 2011 emission inventory). With population, development and traffic have also grown, all of which are indicators of ozone precursor emitting activities. Outside of the Phoenix-Mesa Urbanized Area, and even in large expanses of it, there is little population or activity. However, the area that appears to have experienced the most growth, and has some of the most growth potential due to land ownership, existing infrastructure, and ease of transportation to and from the Phoenix area is the San Tan Valley. San Tan Valley was not even classified as a CDP in the 2000 U.S. Census, and according to the 2010 Census, there were 81,321 people in the 35.781 square mile area of the CDP alone, with a density of 2,273 people per square mile. There is clearly a tight link between Pinal County and Maricopa County as 45% of surveyed working residents in Pinal County commute to Maricopa County for work. Traffic analysis supports this due to relatively significant traffic in the San Tan Valley area. ADEQ's recommended area captures 94% of the population in the Phoenix-Scottsdale-Mesa CBSA and 89% of the VMT for the area so that most high emitting activities caused by the urbanized area are included in the recommended area.

There has been no growth in the immediate area surrounding the Gila County monitor. The Gila monitor is located in the Payson Micropolitan Area. The urbanized area of Payson is quite far away from the monitor and is far less populated and dense than the Phoenix-Scottsdale-Mesa Metropolitan Statistical Area.

The lack of growth near the Gila monitor and the increased growth in San Tan Valley, which is close in proximity to the Queen Valley monitor, lead ADEQ to further analyze these areas through meteorological and topographical analyses for possible transport paths to these monitors.

ADEQ analyzed back trajectories for the Gila monitor to verify that emissions impacting the Gila monitor were likely from the Phoenix area as opposed to the Payson area. As shown in the HYPPLIT trajectories in [Figure 3-45](#) above, and Exhibit AI1 of Appendix A, the likely source of emissions impacts are from the Phoenix area, rather than the Payson area. As discussed in [Section 3.4.4](#), there may sometimes be enough momentum from the southwestern flow to push emissions from Phoenix up and over the mountains near Roosevelt Lake to reach the Gila monitor.

As shown in the Queen Valley HYPPLIT trajectories in [Figure 3-41](#) above, and Exhibit AI15 of Appendix A, several HYPPLIT back trajectories pass through Maricopa County and over the San Tan Valley area before reaching the Queen Valley monitor. In fact, the Queen Valley monitor is listed in ADEQ's monitoring plan as a PAMS site "considered to be downwind of the source of

maximum precursor emissions in the Phoenix metropolitan area.”⁵⁵ Given the topography and known mountain valley flow, as evidenced by the sloshing effect mentioned in [Section 3.4.4](#), and the diurnal meteorological analysis in [Section 3.4.3.2.3](#) showing a mainly western flow of actual winds during exceedance time periods, the Queen Valley monitor is likely impacted by emissions activities in the 2008 Phoenix-Mesa Ozone Nonattainment Area and San Tan Valley.

For all the reasons above, if both the Queen Valley monitor in Pinal County and the Gila monitor are violating given future design values, ADEQ recommends that the 2015 Phoenix ozone nonattainment area include the Queen Valley monitor and San Tan Valley, and a small portion of Gila County to include the Tonto National Monument monitor.

⁵⁵ ADEQ, *State of Arizona Annual Monitoring Network Plan*, p. 27 (2014), available at <http://www.azdeq.gov/enviro/air/assessment/download/amnp2014.pdf>.

4 Yuma Nonattainment Area

ADEQ recommends that only a small part of Yuma County should be nonattainment. While ADEQ lays out some data reflecting the five factors below, ADEQ determined it was only appropriate to apply the five factors to a very tight area around the monitor. See [Section 4.6](#) for further explanation as to why the five factors are not reasonably applied to the Yuma area. [Figure 4-1](#) below shows the recommended boundary, and [Figure 4-2](#) shows the recommended boundary in the context of other relevant data.

Figure 4-1 Yuma Nonattainment Area

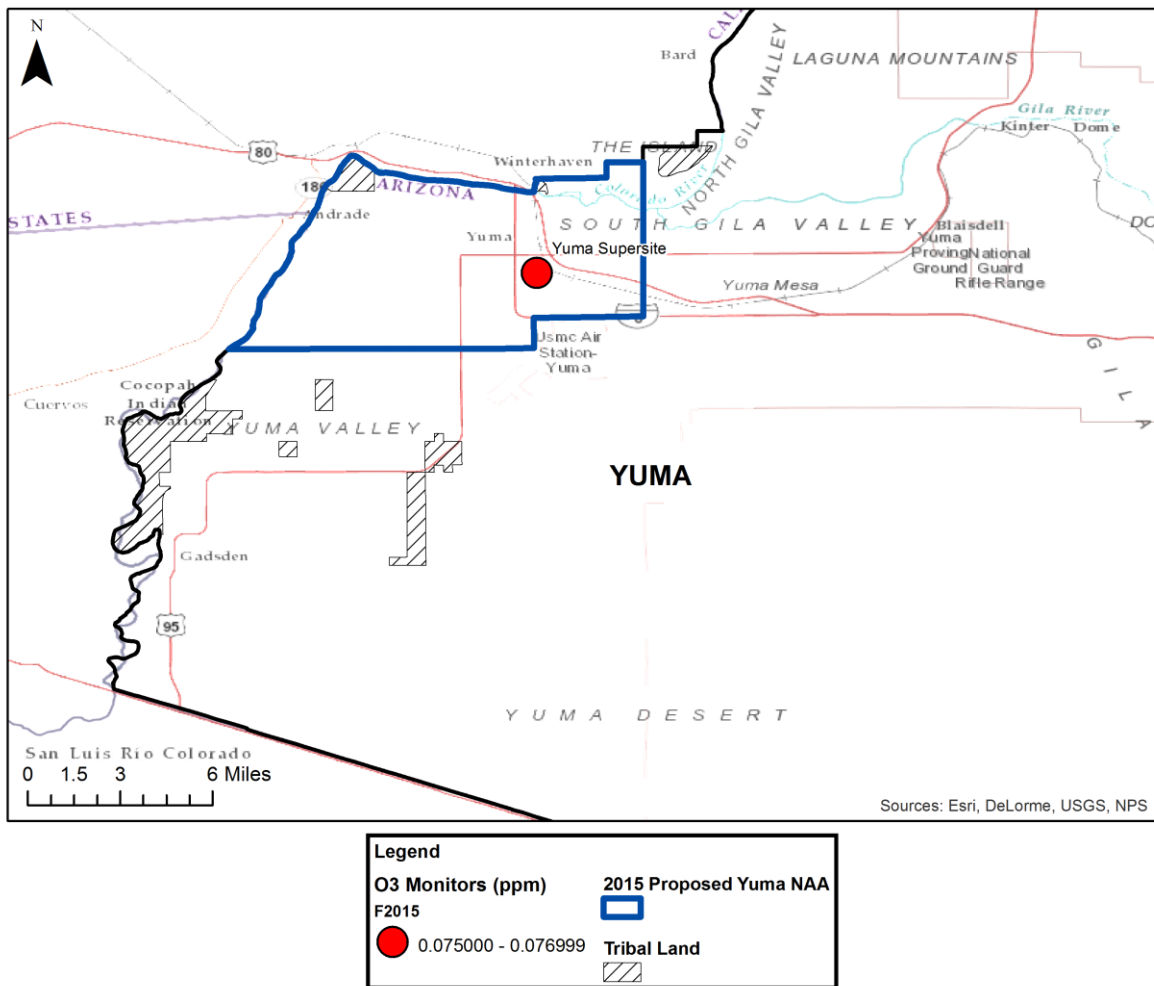
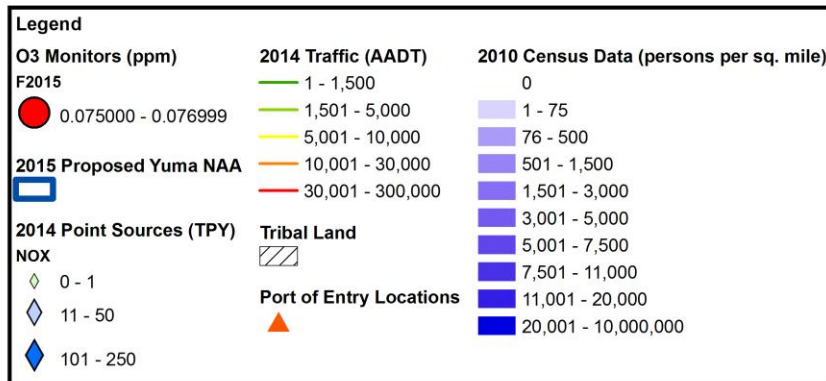
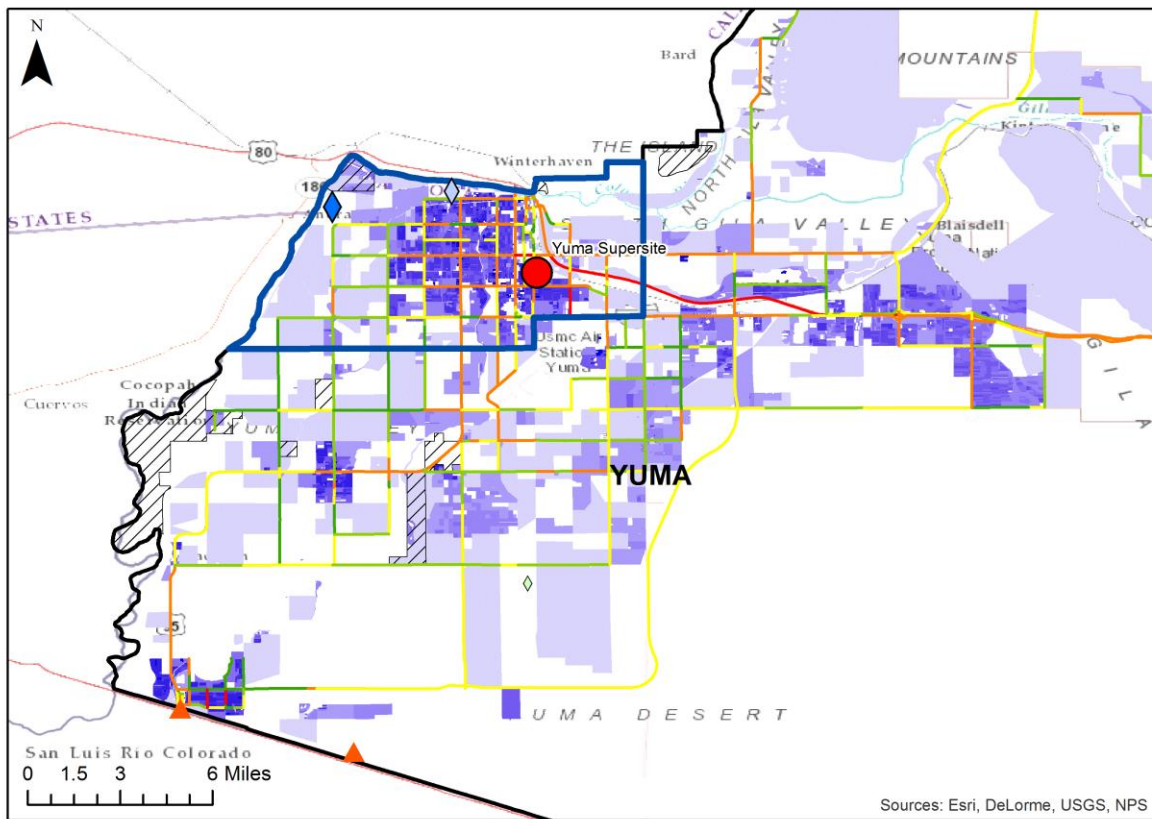


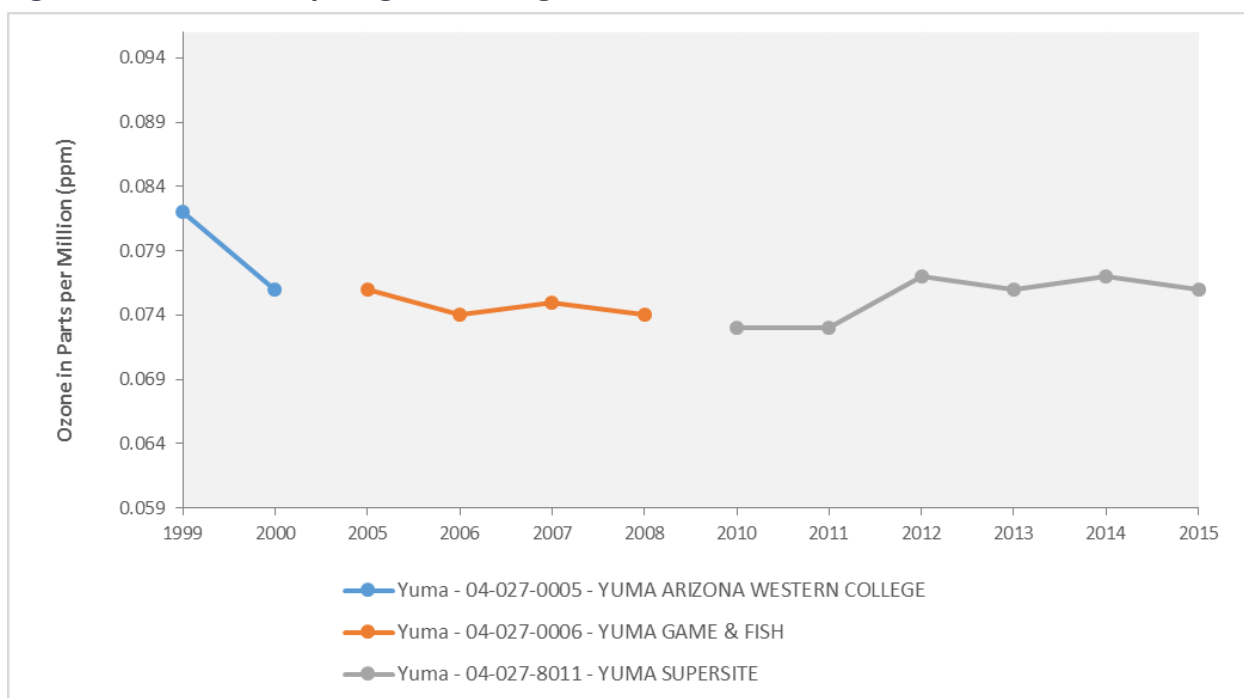
Figure 4-2 Yuma Nonattainment Area with Relevant Data



4.1 Air Quality Data

There is currently only one ozone monitor in the Yuma area, Yuma Supersite, which is operated by ADEQ. Design value concentrations at Yuma Supersite have generally trended upward since 2010, but looking at historical monitors in Yuma, concentrations have trended downward since 1999 (Figure 4-3).

Figure 4-3 Yuma County Long-Term Design Value Trend



4.2 Emissions and Emissions-Related Data

ADEQ evaluated emissions and emissions-related data from Yuma County. [Table 4-1](#) and [Table 4-2](#) represent 2011 NEI emission data for NO_x and VOCs, respectively. Emissions totals are rather low, especially when compared to an area like Maricopa County or Southern California. It should be noted that approximately 95.5% of all VOCs in the county are estimated to be from biogenic emissions (e.g. vegetation and soils).

Table 4-1 Yuma County NO_x Emissions

NO _x Emissions		
Source Type	Emissions (TPY)	Percent of Total
Point Source	418	5.3%
Nonroad	898	10.8%
Onroad	4,234	50.9%
Nonpoint	2,768	33%
Total	8,318	100%

Table 4-2 Yuma County VOC Emissions

VOC Emissions		
Source Type	Emissions (TPY)	Percent of Total
Point Source	109	.2%
Nonroad	1,586	1.1%
Onroad	2,561	1.7%
Nonpoint	142,879	97 %
Total	147,135	100%

4.2.1 Point Source Data

Figure 4-4 and Figure 4-5 give visual representations of NO_x and VOC emission sources. There are very few point sources in Yuma County. There are two major point sources in the immediate area, an electric generating station (emitted approximately 135 tons of NO_x and 9.6 tons of VOCs during 2011) and a cogeneration plant (emitted only 23 tons of NO_x and 0.705 tons of VOCs during 2011). Yuma Proving Grounds are also nearby but the emissions are minimal (24.77 tons of NO_x and 21.5 tons of VOCs during 2011). Also, the facility is north of the monitor and HYSPLITs do not show that the facility is likely to contribute to the monitor. See Section 4.3.2 for the HYSPLIT analyses. South Yuma County Landfill is also nearby, but its emissions are similarly minimal (0.041 tons of NO_x and 27.6146 tons of VOCs during 2011). The landfill emits almost no NO_x emissions and VOC emissions are extremely small in comparison to total county VOC emissions (See Section 4.2 above). These figures represent 2014 permitted point source data as reported by ADEQ, binned and displayed by actually emitted tons per year thresholds, and also shows the proposed Yuma nonattainment boundary.

Figure 4-4 Permitted NOx Point Sources

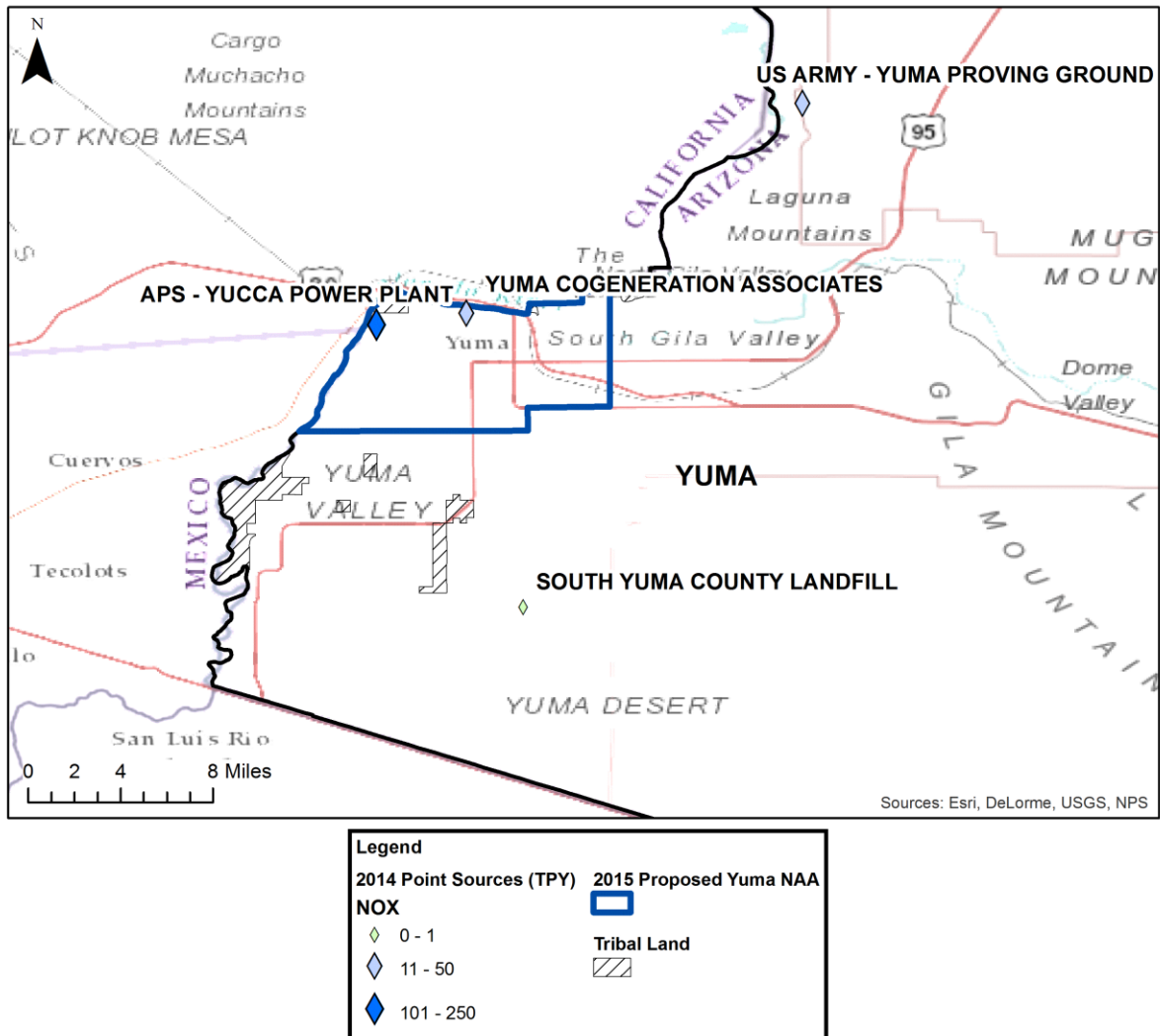
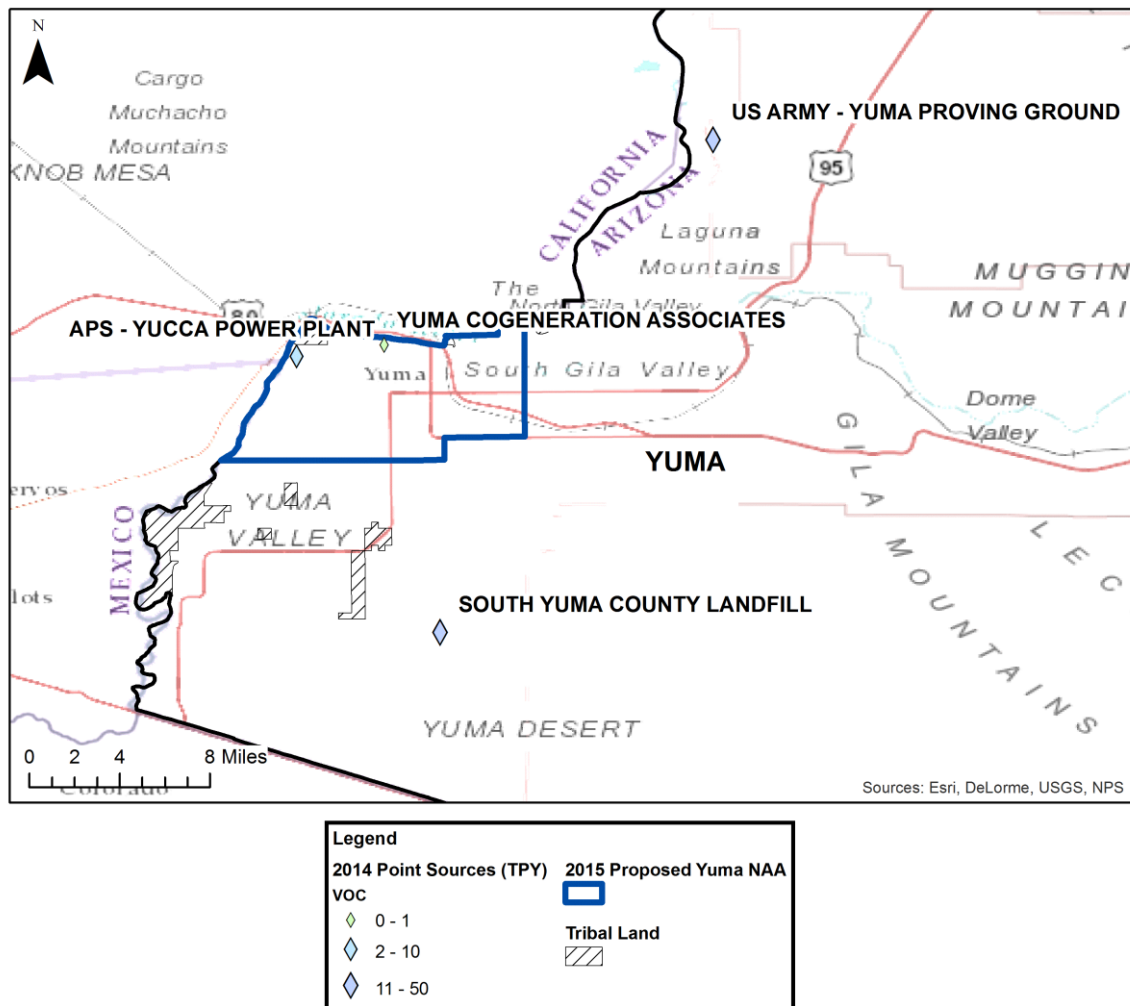


Figure 4-5 Permitted VOC Point Sources



4.2.2 Traffic Data

The Yuma area is a land port area and therefore subject to substantial amounts of transient interstate and international traffic. In addition, much of the economy in the Yuma area is seasonally dependent because of a higher rate of agricultural activity during cooler months. The Yuma area houses two ports of entry, POE I in San Luis for personal vehicles and POE II east of San Luis for commercial traffic. Yuma is located on Interstate 8, which provides access between San Diego and Phoenix via Interstate 10. I-10 extends to Florida and also links to the I-40, which provides access to eastern states further north.

According to U.S. Customs and Border Protection located at POE II, all commercial truck traffic is diverted to POE II. State Route (SR) 195 provides ease of access between POE II and I-8. The interstate connections provide access for truck freight traffic between states and countries. According to Yuma Metropolitan Planning Organization ("YMPO"), "seventeen major trucking

companies are located in the YMPO region.”⁵⁶ While some truck shipments carry goods from Yuma to Mexico, the majority of shipments originate from Mexico with intended destinations outside of Yuma, typically to Los Angeles, San Diego, and Phoenix.⁵⁷ However, between 2013 and 2015, POE II experienced an average of only 33,027 commercial trucks per year, whereas a location like Nogales, AZ saw an average of 314,475 trucks over the same time period,⁵⁸ indicating that the area is not a huge shipping center.

Personal vehicles typically travel along Main Street between I-8 and the Mexican border. San Luis saw an annual average of 3,027,763 personal vehicles between 2013 and 2015, and comparably, Nogales experienced an average of 3,306,484 personal vehicles over the same time period.⁵⁹ According to YMPO, higher percentage traffic volume occurs in the cooler months because the agricultural season peaks during the winter.⁶⁰ This is because of agricultural worker travel from Mexico into the Yuma area to work, and because of other agricultural traffic related flows during planting and harvesting seasons. YMPO states that “aggregate traffic volumes in February 2012 were 33 percent higher than in July 2012.”⁶¹

According to 2014 HPMS data, the proposed nonattainment area captures approximately 19% of the total county VMT, or 379,091,328 annual VMT out of 1,996,740,940 annual VMT for the entire county. See [Figure 4-6](#) below for an image of AADT in the Yuma area and the locations of the two ports of entry.

⁵⁶ YMPO, *2014-2037 Regional Transportation Plan (RTP)*, p. 111 (2013), available at http://ympo.org/wp-content/uploads/2013/01/YMPORPTP_FINAL_5-LOW-RES.pdf

⁵⁷ *Id.* at 105.

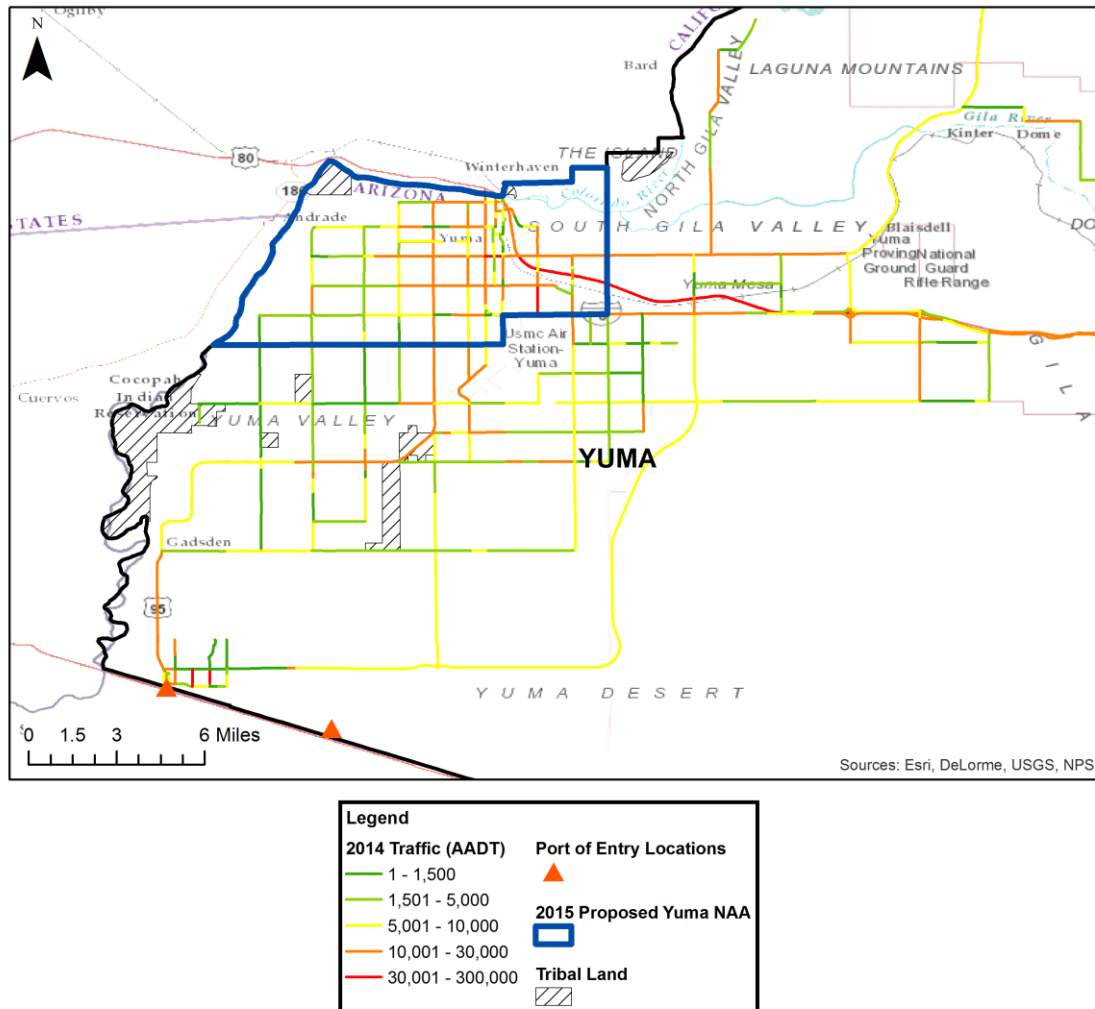
⁵⁸ U.S. DEPARTMENT OF TRANSPORTATION, *Border Crossing Query Detailed Statistics* (recent data from January – March 2016) http://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BCQ.html.

⁵⁹ http://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BCQ.html

⁶⁰ *Yuma RTP supra* note 56 at 38-39.

⁶¹ *Yuma RTP supra* note 56 at 38-39.

Figure 4-6 Yuma Nonattainment Area Traffic



4.2.3 Population Data

Population may serve to inform areas that should be included in a nonattainment boundary. [Figure 4-7](#) and [Figure 4-8](#) represent the change in population density in the Yuma area between the years 2000 and 2010, according to the U.S. Census. [Table 4-3](#) shows the change in actual population in the Yuma area between 2000 and 2010. [Table 4-4](#) also represents the change in population of the Census Designated Place (CDP) Fortuna Hills. While the area of the proposed nonattainment area only captures approximately 1% of the area of Yuma County, (52 square miles out of 5,523 square miles), the area still encompasses the main population center, capturing approximately 45% of year 2010 population (87,348 out of 195,751 people).

Figure 4-7 2000 Census Population Density in Yuma

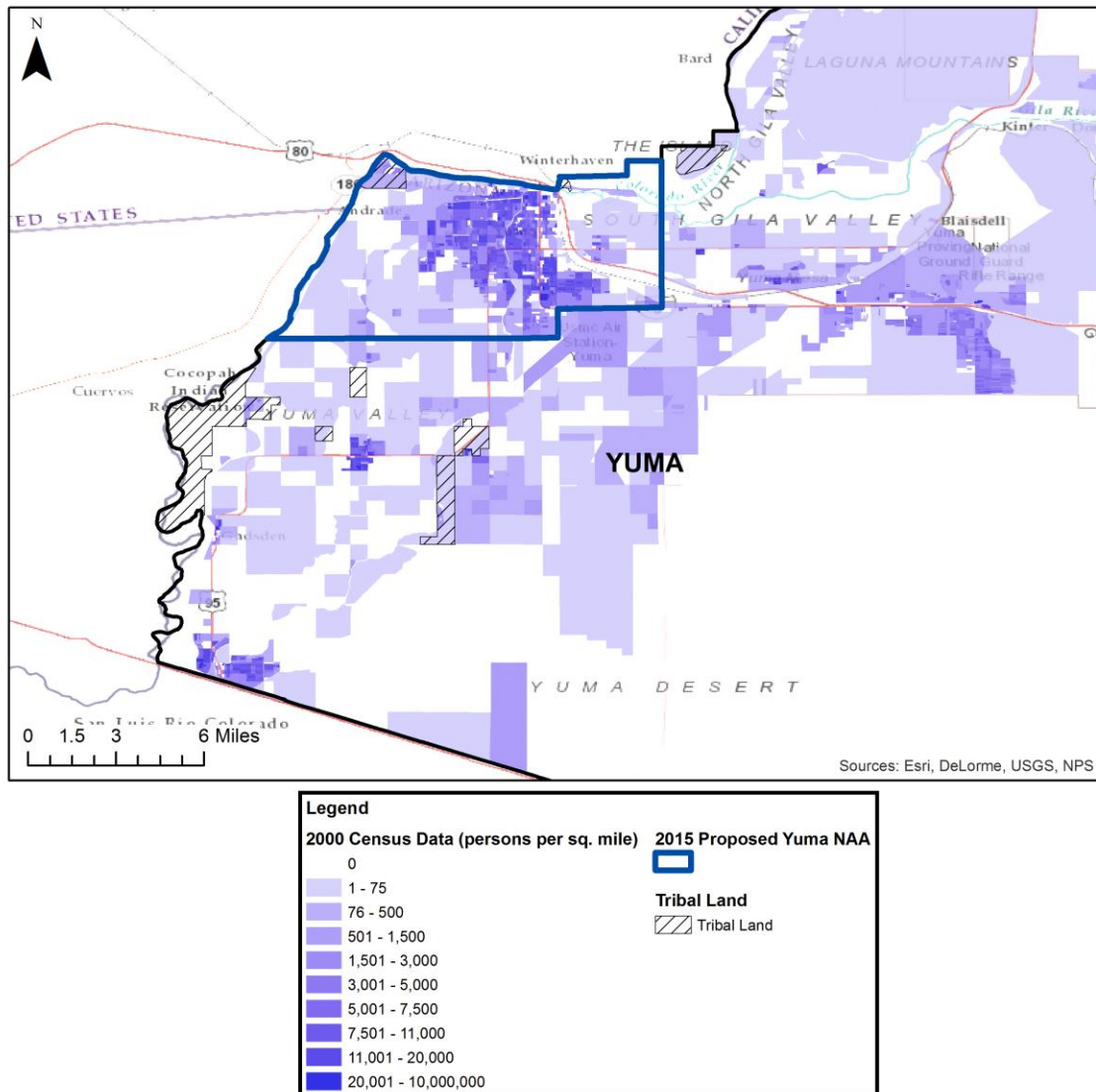


Figure 4-8 2010 Census Population Density in Yuma

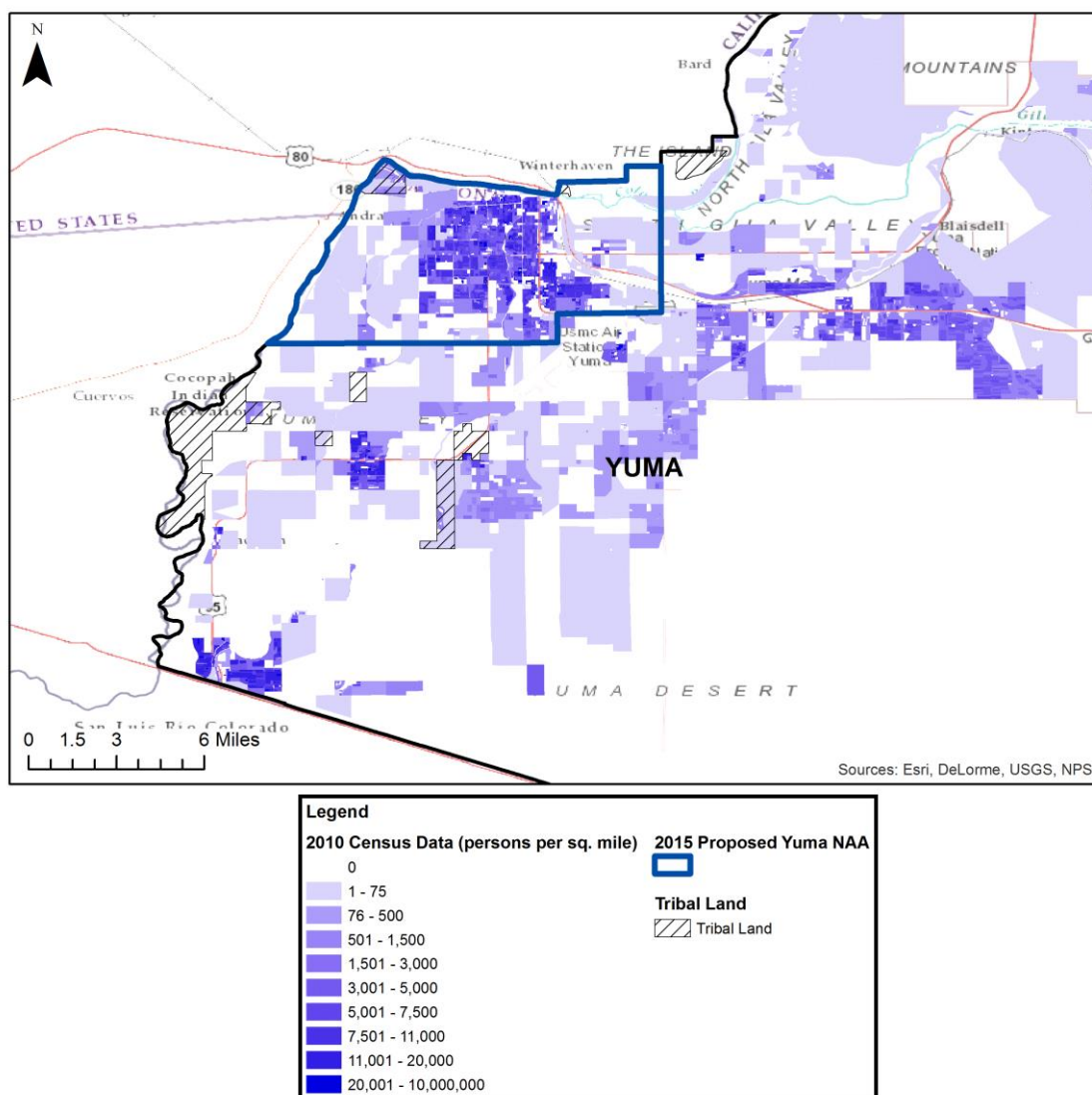


Table 4-3 Yuma Area Population Changes between 2000 and 2010

Population	Municipality	2000 Persons	2010 Persons	Percent Growth
	San Luis	15,322	25,505	66.5%
	Somerton	7,266	14,287	96.6%
	Wellton	1,829	2,882	57.6%
	Yuma	77,515	93,064	20.1%
	Balance of County	58,094	60,013	3.3%
	Yuma Total	160,026	195,751	22.3%

Table 4-4 CDP Population Change

Area Name	2000 Population	2010 Population	% Growth
Fortuna Hills (CDP*)	20,478	26,265	28%

4.2.4 Transport Data

Transport and background, such as that described in [Section 2.3.2](#) clearly affects nonattainment at the Yuma monitor. Evidence shows that emissions are transported to the Yuma area and affect concentrations at the monitor. There is relatively little population or industry in the area, and yet concentrations at the monitor are several parts per billion higher than the standard.

EPA has estimated that about 7% of 2017 projected concentrations at the Yuma monitor are attributable to manmade sources from within Arizona.⁶²

In a separate assessment,⁶³ but likely using the same data, EPA also projected ozone concentrations out to 2017 for the 2008 standard, for exceedance days of 76 ppb and higher, that Arizona manmade sources would contribute 6% of the projected concentration at the Yuma monitor, California manmade sources would contribute 20%, Mexico and Canada would contribute 7%, and biogenics would contribute 4% ([Table 4-5](#)).

Table 4-5 EPA Transport Modeling Results for Yuma

County	2017 Avg. DV (ppb)	AZ (ppb) and % of projected DV		CA (ppb) and % of projected DV		Canada & Mexico (ppb) and % of projected DV		Initial ⁶⁴ & Boundary ⁶⁵ (ppb) and % of projected DV		Biogenics (ppb) and % of projected DV		Everything Else (other states, tribal, fires, offshore, etc.) (ppb) and % of projected DV	
Yuma	70.7	4.32	6%	13.81	20%	5.08	7%	43.36 ⁶⁶	61%	2.69	4%	1.30	2%

⁶² *Background White Paper*, *supra* note 17 at 11 and Table 2c.

⁶³ EPA, *Air Quality Modeling TSD for the 2008 Ozone NAAQS Cross-State Air Pollution Rule Proposal, Data File with 2017 Ozone Contributions* (November 2017), available at <https://www.epa.gov/airmarkets/proposed-cross-state-air-pollution-update-rule>.

⁶⁴ Initial condition for this model's purposes is "the time-varying chemical state of the atmosphere just outside the edges of the modeling domain." EPA, *Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM25, and Regional Haze, Memorandum from Richard Wayland, Air Quality Assessment Division Director to Regional Air Division Directors Regions 1-10*, p. 58 (Dec. 3, 2014), available at https://www3.epa.gov/scram001/guidance_sip.htm (last visited May 18, 2016).

⁶⁵ Boundary condition for this model's purposes is the "specification of the initial state of the chemical conditions within the [modeling] domain at the first step of the modeling period." *Id.*

⁶⁶ "Given limitations in available ambient data, it is impossible to exactly specify the complex three dimensional chemical characteristics of the initial or boundary conditions." *Id.*

4.3 Meteorology

Temperatures in Yuma, Arizona are similar to those in the Phoenix area with highs during ozone season ranging from about 86 to 107 degrees Fahrenheit, but Yuma has even less precipitation overall. See [Table 4-6](#) for a general climatic summary:

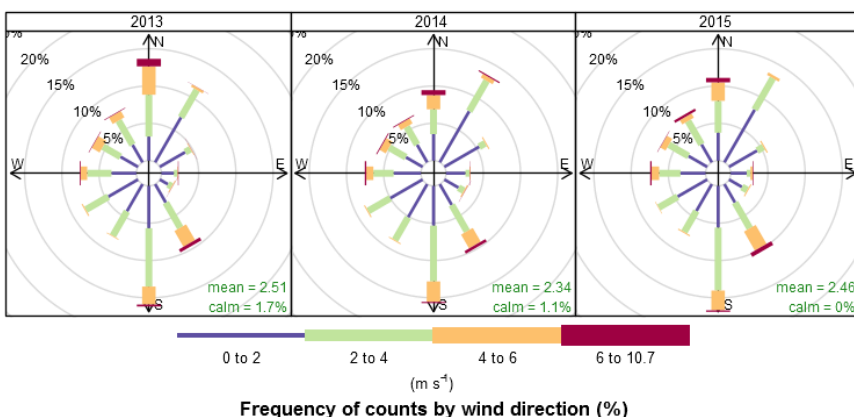
Table 4-6 Climate Summary at Yuma Proving Ground, AZ⁶⁷

Years 1955-2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max. Temp. (F)	68.6	72.9	78.6	85.6	94.1	103.2	106.7	105.5	100.6	89.8	76.9	67.8	87.5
Avg. Min. Temp. (F)	43.3	46.8	51.4	57.2	64.8	72.9	80.8	80.8	74.2	62.1	50	42.7	60.6
Avg. Total Precip. (in.)	0.51	0.42	0.33	0.14	0.03	0.04	0.23	0.53	0.42	0.31	0.25	0.45	3.64

4.3.1 Wind Roses

[Figure 4-9](#) presents wind roses showing the annual wind patterns at the Yuma Supersite monitor for 2013-2015. The average wind rose shows a split between northerly and southerly winds. Northerly winds are more frequent in the winter.

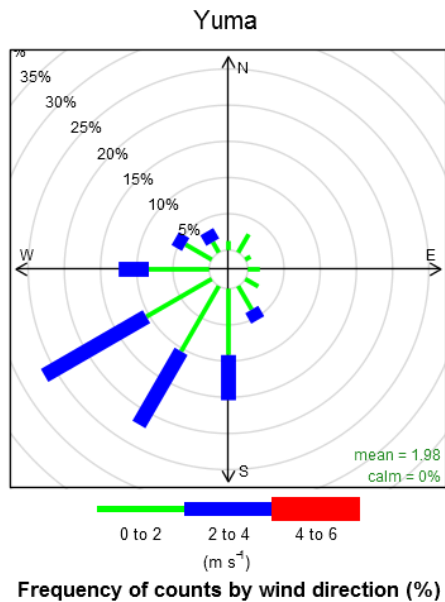
Figure 4-9 Yuma Supersite Monitor – Annual Winds



[Figure 4-10](#) presents a wind rose showing the 24 hour wind patterns for the 10 highest days in 2013-2015 at the Yuma Supersite monitor.

⁶⁷ WESTERN REGIONAL CLIMATE CENTER, *Yuma Proving Grounds*, <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?az9654> (last visited May 27, 2016).

Figure 4-10 Yuma Supersite Monitor – 10 Highest Ozone Concentration Day Winds



4.3.2 HYSPLIT Analyses

Pictured in [Figure 4-11](#) and [Figure 4-12](#) are 24 hour HYSPLIT back trajectories to the Yuma Supersite ozone monitor in Yuma County. The images reflect a trajectory for each hour in the 8 hour exceedance day average for the 10 highest ozone concentration days between 2013 and 2015. Note that Yuma Supersite has not historically reported monitoring data during November through March.

Figure 4-11 Yuma Supersite – 10 Highest Ozone Concentration Days HYSPLIT Back Trajectories

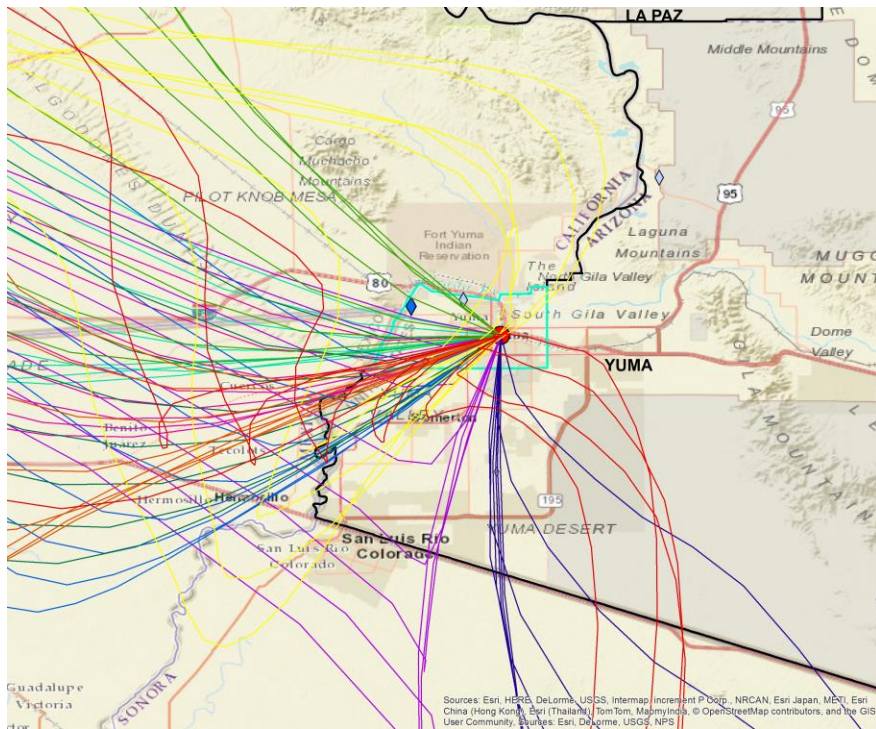


Figure 4-12 Yuma Supersite – 10 Highest Ozone Days HYSPLIT Back Trajectories Broad View

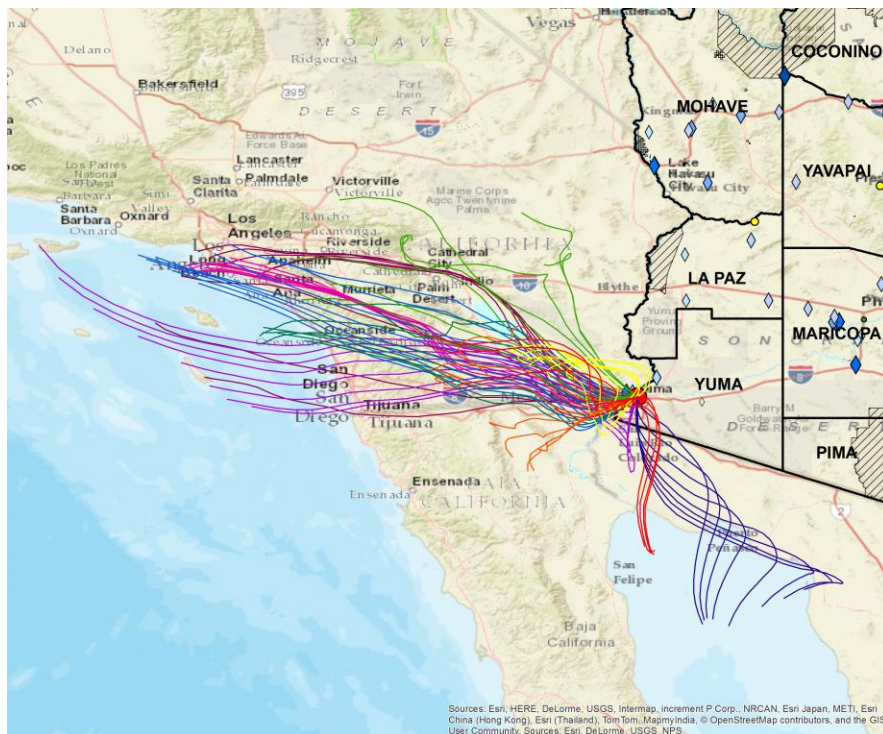
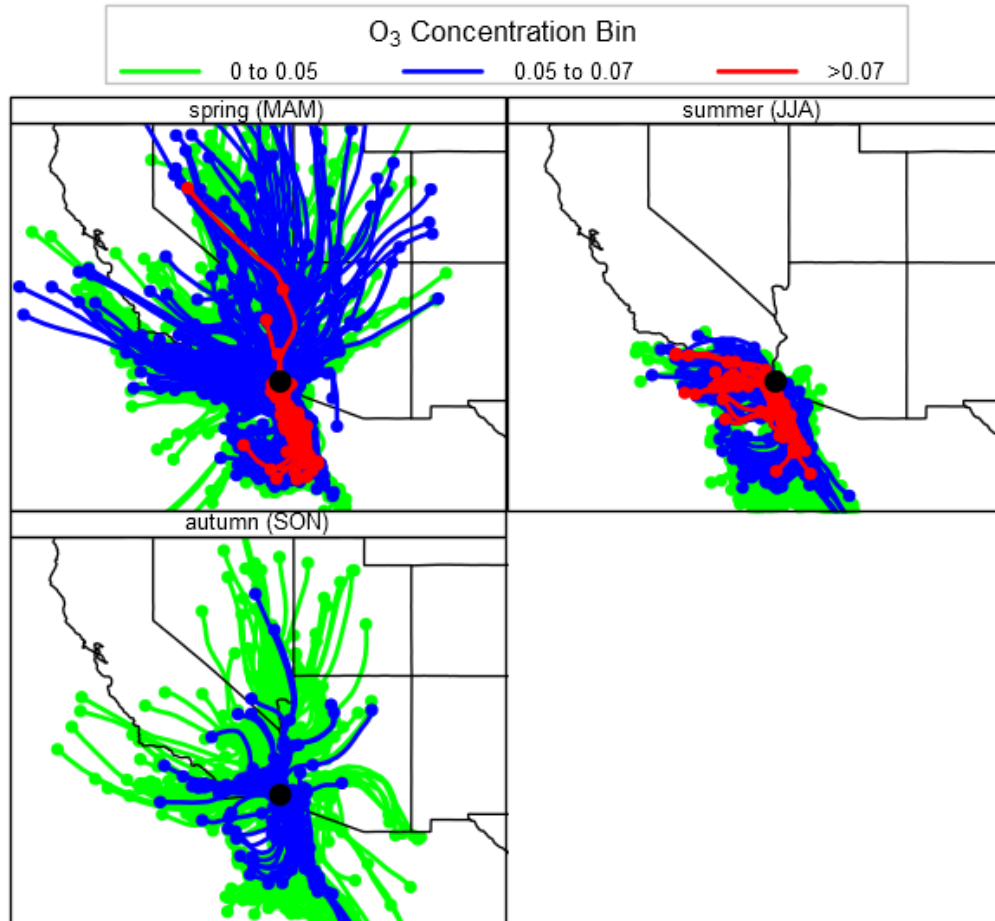


Figure 4-13 below is a diagram representing HYSPLIT 24 hour back trajectories. A trajectory is drawn to represent every third hour in a two year period (2013-2014), and color-coded by concentration. The image is provided in order to give an overall contextual picture of modeled

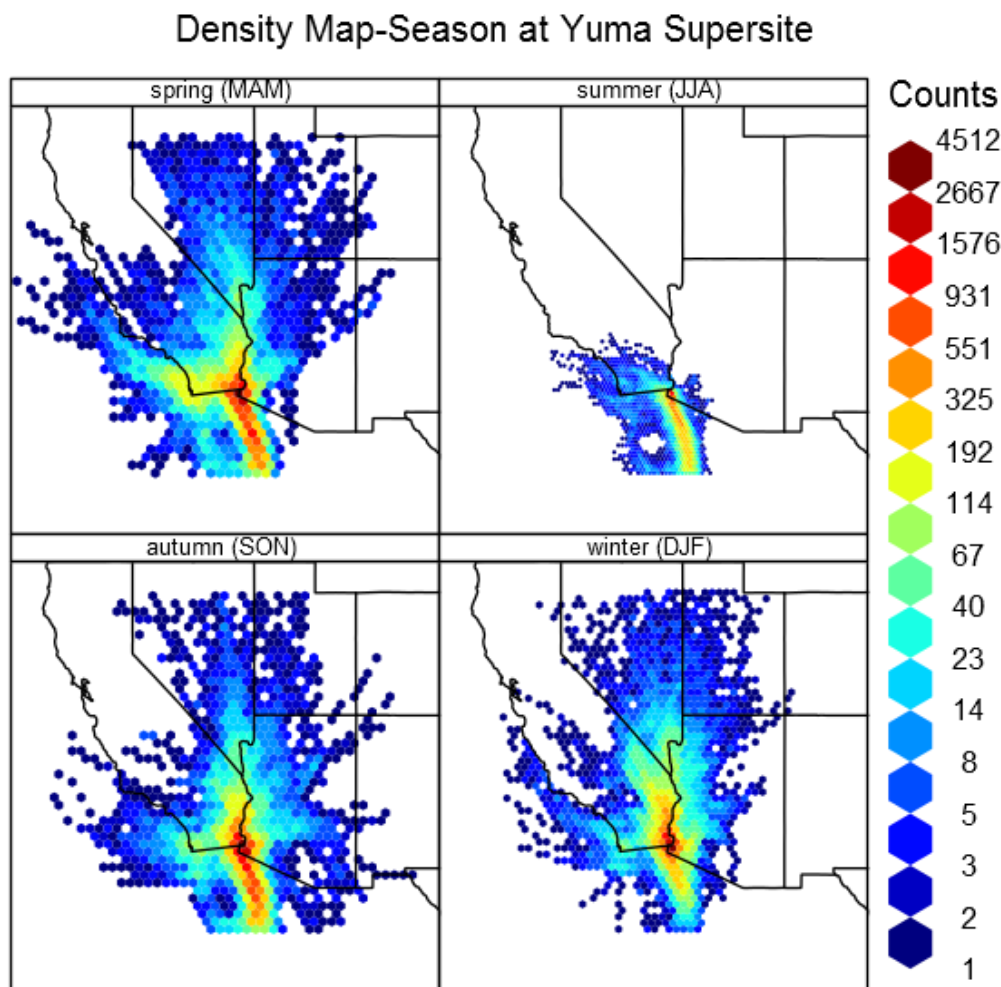
incoming meteorology over the course of a year. Note that during 2013 and 2014, Yuma Supersite did not report monitoring values for November through February.

Figure 4-13 Yuma Supersite Seasonal Ozone Concentration Specific HYSPLIT Trajectory Map



In [Figure 4-14](#) below, see a back-trajectory density analysis showing how frequently modeled wind trajectories passed through gridded area sections on their way to the Yuma Supersite monitor between 2013 and 2014. A 24 hour trajectory is drawn to represent every third hour in a two year period (2013-2014)

Figure 4-14 Yuma Supersite Seasonal HYSPLIT Density Map



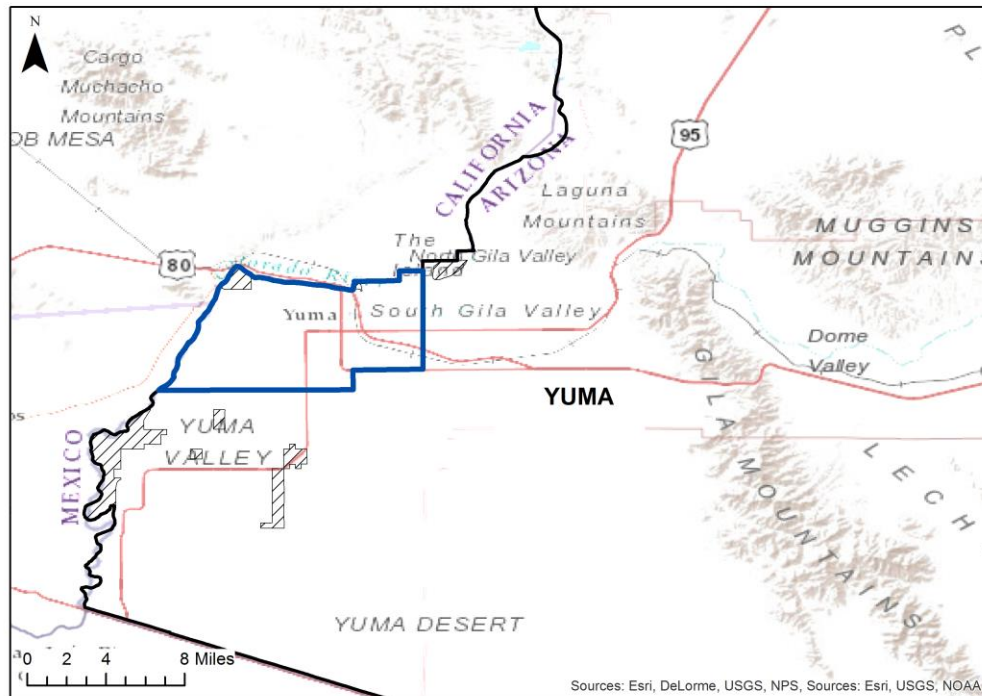
For methodology and additional HYSPLIT model results please see Appendix A, section 3 and Exhibit A1, Section 16.

4.4 Topography

Yuma is located along the Interstate 8, where the Gila River meets the Colorado River, in the Yuma Desert, which is a low elevation section of the Sonoran Desert in the southwestern most corner of Arizona. The Yuma Desert has several masses of sand dunes, south and southeast of the city and near the border, which house very little vegetation. However, much of the land in the City of Yuma area, I-8 corridor, and continuing into both Mexico and California is used for agricultural purposes. Yuma is bordered by California to the west and Mexico to the south. The area is bordered by the Colorado River to the west, the Gila Mountain Range to the east and the Laguna Mountain to the northeast. The Gila Mountains are approximately 26 miles long, 5 miles wide, peaking at 3,156 feet, and run south from the Gila River to fade into the Tinajas Atlas Mountains, which follow the same vector south to the Mexican border. The Laguna Mountains

are a circular mountain range north of the City of Yuma, north of the Gila River, ranging approximately 7 miles by 7 miles, peaking at approximately 1,080 feet, and are bordered on the west by the Colorado River. See an overall topographic view of the area in [Figure 4-15](#).

Figure 4-15 Yuma Area Topography



4.5 Jurisdiction

Yuma Metropolitan Planning Organization (YMPO) is the MPO for the Yuma region. YMPO is designated as a bi-state MPO because the region includes all of Yuma County, Arizona and the community of Winterhaven in Imperial County, California ([Figure 4-16](#)). ADEQ has sole air quality planning, permitting, and enforcement authority in Yuma County at this time, except on tribal land. There are two points of entry south of the City of Yuma in San Luis,⁶⁸ both of which facilitate border traffic to and from Mexico. Both point of entries are manned by U.S. Customs and Border Protection. The City of Yuma and the I-8 corridor is sandwiched between vast U.S. military occupied lands: Yuma Proving Grounds to the north and east and the Barry M. Goldwater Range Air Force Base to the south and east ([Figure 4-17](#)). The southeast corner of Yuma County houses the Cabeza Prieta National Wildlife Refuge (adjacent to the Goldwater Range).

⁶⁸ One point of entry facilitates general border traffic only, and the other facilitates commercial traffic only.

Figure 4-16 Yuma Area Jurisdiction and Tribal

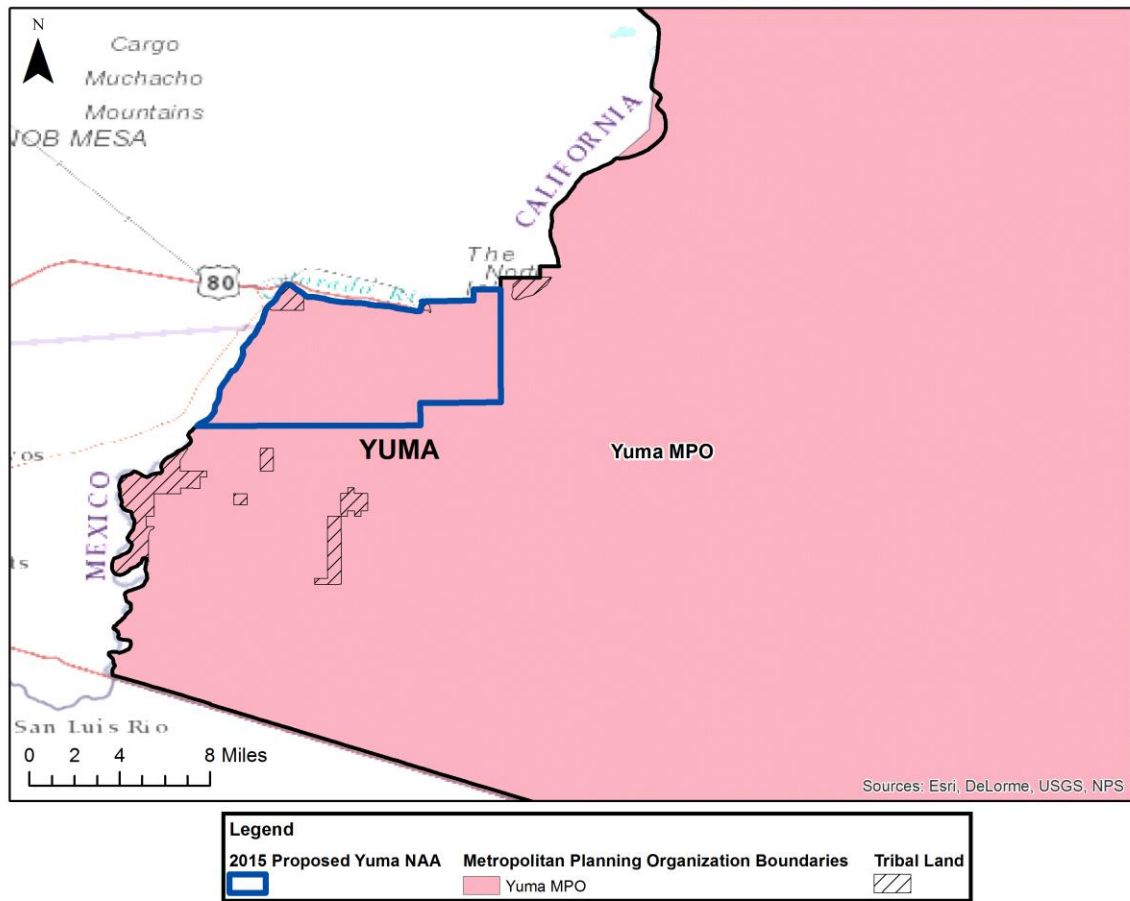
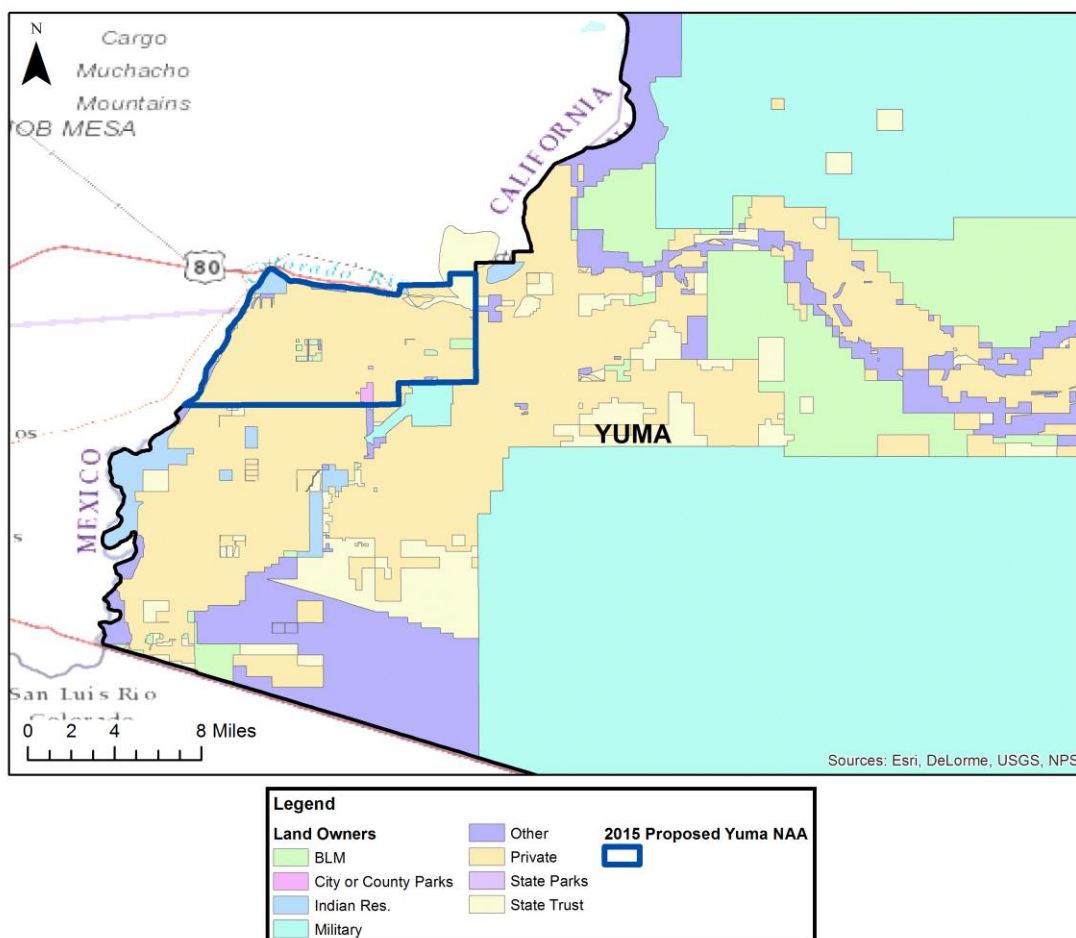


Figure 4-17 Yuma Area Land Owners



4.6 Weight of Evidence Analysis and Recommendation Summary

The Boundary Guidance's recommended five factors may inform the boundary of the nonattainment area, but Yuma is not an urban area that substantially contributes to its own nonattainment.⁶⁹ The Yuma area does not likely contribute to its own nonattainment on high ozone days and for this reason, ADEQ recommends a smaller nonattainment boundary.

There are few permanent point sources of ozone precursors in Yuma, and few controllable sources otherwise. Much of the emissions in Yuma are likely transported, given the above HYSPLIT analyses in [Section 4.3.2](#) and EPA modeling. Approximately 27% of the concentration at the monitor is attributable to emissions from California and Mexico according to EPA's transport modeling as compared to only 6% of monitor impacts being attributable to anthropogenic

⁶⁹ EPA's Arizona's local contribution to ozone concentrations at the Yuma monitor is 6%, as compared to an estimated average of 39% manmade contribution to monitors in Maricopa County.

Arizona emissions.⁷⁰ Not only are much of the emissions affecting Yuma's high concentrations transported, almost all nonpoint VOC emission are attributable to biogenic emissions. Also, a significant chunk of the annual onroad emissions, which are approximately 50% of overall NO_x in the area and the highest source of NO_x in the Yuma area, are likely most attributable to transient traffic (as opposed to local traffic) because Yuma is a port city. There is no way to control Mexican car emissions locally or federally. Additionally, as stated above, Yuma's highest traffic volumes occur in the winter, and not during ozone season.

While ADEQ can appreciate the five factor analysis as a valuable tool for many areas with controllable and local sources, ADEQ does not believe the factors can be reasonably applied and weighted heavily upon the Yuma area. Instead, ADEQ finds it reasonable that the area be drawn smaller than might be drawn when strictly applying the five factors. The area should be reasonably limited to the highest populated area and include the existing major and possibly impactful point sources to the monitor. Given the recommended area, 45% of the county's population is captured, 19% of the total county VMT is captured, and the highest emitting and only real possibly contributing permitted point sources are captured.

To establish a larger area would not protect public health or the environment because there would be minimal benefits from future controls on what few emissions there are outside of the recommended boundary. It has been stated in the Regional Impact Analysis that even given "large regional NO_x and VOC reductions," the Yuma area shows a limited response.⁷¹ This means that in the meantime, the area will be bumped up to higher nonattainment classifications in the future, and subject to limited economic development, through little fault of its own. If this is the case, then it is unreasonable to subject the Yuma area to more economic burdens than necessary. Therefore, as suggested in EPA's Background White Paper,⁷² ADEQ recommends a smaller nonattainment boundary for the Yuma area because the Yuma monitor is likely minimally impacted by nearby sources on high ozone days, as substantiated by EPA's background modeling.

⁷⁰ EPA's Transport Modeling, *supra* note **Error! Bookmark not defined.**

⁷¹ Background White Paper, *supra* note 17 at 2; see also EPA, *Regulatory Impact Analysis of the Final Revisions to the NAAQS for Ground-Level Ozone*, p. 2A-33 - 2A-34 (2015), available at <https://www3.epa.gov/ttnecas1/ria.html>.

⁷² Background White Paper, *supra* note 17 at 12 ("At monitor locations exceeding the 70 ppb standard where there are no or few nearby permanent sources of O₃ precursors, or where nearby sources are shown to be unlikely contributors on days with high O₃, states can recommend, and the EPA may be able to finalize, a nonattainment area boundary that includes a limited area associated with a reasonable jurisdictional boundary, for example, a park boundary for a monitor located in a national park.").

5 Recommended 2015 Ozone Attainment/Unclassifiable Areas in Arizona

5.1 Attainment/Unclassifiable Areas (Including Mohave County)

All other areas within the state that are not otherwise discussed in Sections 3 and 4 above and which are under Arizona's jurisdiction (e.g. excluding tribal land areas) are recommended as attainment/unclassifiable areas.

Recommended attainment areas meet the NAAQS for ozone. Unclassifiable areas are those areas for which ADEQ does not have enough information to designate as either attainment or nonattainment. The rest of the state of Arizona not recommended for nonattainment is recommended as attainment/unclassifiable,⁷³ including the following:

Remainder of Maricopa, Pinal, Gila, and Yuma Counties

- Apache County
- Cochise County
- Coconino County
- Greenlee County
- Graham County
- La Paz County
- Mohave County
- Navajo County
- Pima County
- Santa Cruz County
- Yavapai County

Should monitors in any of the above counties become nonattaining monitors given future design values, ADEQ will revise these recommendations to reflect the appropriate boundary.

5.2 Mohave Specific Attainment Unclassifiable Discussion

ADEQ does not believe that any part of Mohave County should be designated nonattainment. According to EPA guidance, EPA may examine nearby in terms of what areas are in a Combined Statistical Area ("CSA") or in the same Core Based Statistical Area (CBSA) (i.e. metropolitan statistical areas ["MSA"] or micropolitan statistical areas). Mohave County encompasses the Lake Havasu City-Kingman, AZ MSA, while Clark County encompasses the Las Vegas-Henderson-

⁷³ For more information see Appendix A (2015 Ozone Boundary Recommendation TSD), Section A2.1: Ozone Design Values.

Paradise, NV MSA. Both MSAs are contained within the Office of Management and Budget delineated Las Vegas-Henderson, NV-AZ CSA. However, just because the counties are in the same CSA, does not mean that Mohave County is contributing to nonattainment in Clark County, or vice versa.

First, despite being 67% larger in area, emissions from Mohave County are much lower than those from Clark County (except for biogenic emissions). See [Table 5-1](#) and [Table 5-2](#) for 2011 NEI information.

Table 5-1 Clark County, Nevada Emissions Totals

Clark County, Nevada (TPY)					
	<i>Point</i>	<i>Nonpoint</i>	<i>Onroad</i>	<i>Nonroad</i>	<i>Total</i>
NOx	8,676	3,870	28,965	10,179	51,690
VOC	967	162,177	12,176	8,368	183,688

Table 5-2 Mohave County, Arizona Emissions Totals

Mohave County, Arizona (TPY)					
	<i>Point</i>	<i>Nonpoint</i>	<i>Onroad</i>	<i>Nonroad</i>	<i>Total</i>
NOx	376	5,057	8,920	1,406	15,760
VOC	94	229,299	3,374	5,023	237,790

[Table 5-3](#) below represents Mohave County emissions as a percentage of Clark County emissions. In the nonpoint VOC emissions category, biogenics are much higher in Mohave County than Clark County. However, when excluding biogenic emissions, VOC emissions in Mohave County are actually 30% of Clark County VOC emissions.

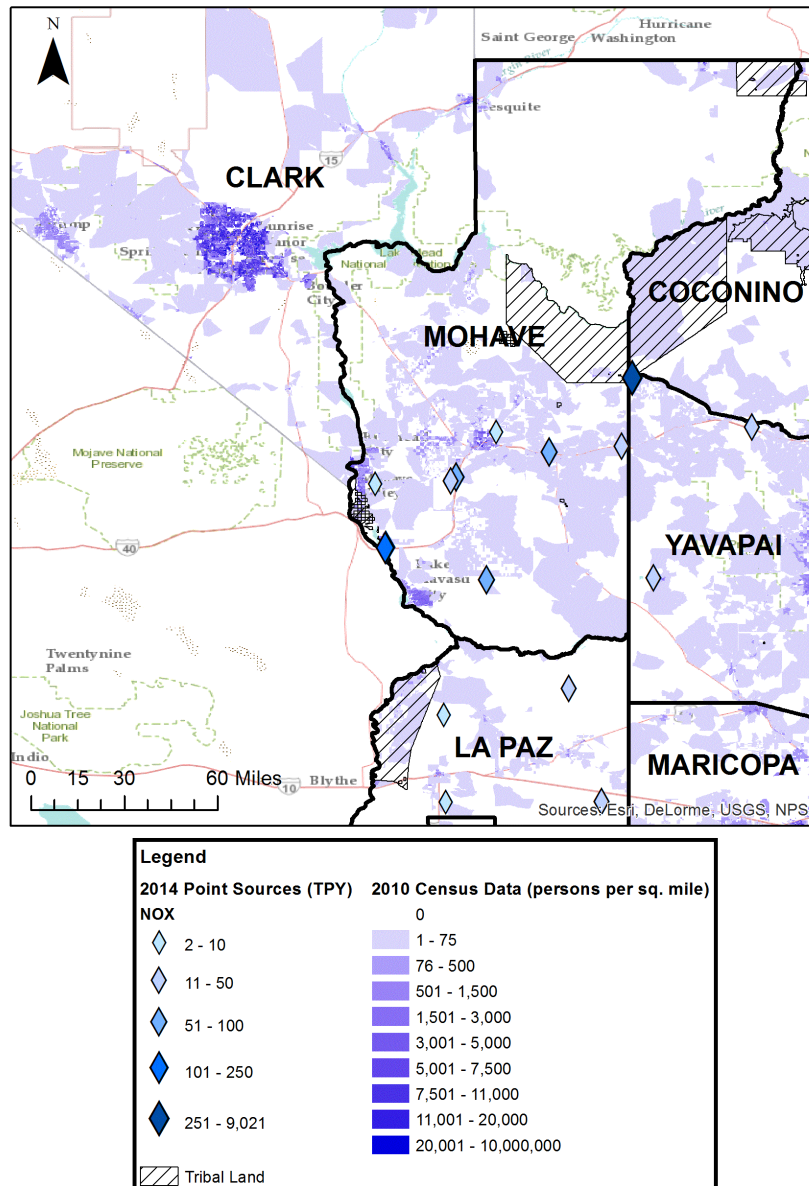
Table 5-3 Mohave County Emissions as Percentage of Clark County Emissions

Mohave County as Percentage of Clark County Emissions					
	<i>Point</i>	<i>Nonpoint</i>	<i>Onroad</i>	<i>Nonroad</i>	<i>Total</i>
NOx	4%	131%	31%	14%	30%
VOC	10%	141%	28%	60%	129%

Second, population centers of Mohave County are located in the middle and the south western portion of the county, near Lake Havasu City, Bullhead City/Laughlin area, and Kingman (see [Figure 5-1](#)). None of the population centers are located physically nearby the Las Vegas area in Clark County. Further, the 2010 population in Mohave County is 200,186 people, compared to 1,951,269 people in Clark County. Hence, Mohave County population is about 10% of Clark County's population.

As for the county's few emitting permitted point sources, most of those are also located in the center and southwestern areas of the county (see [Figure 5-1](#)), and none are physically nearby the Las Vegas area.

Figure 5-1 Mohave County 2010 Population Density and 2014 Permitted NOx Point Sources



In addition, because Arizona did not run any HYSPLITs for the Clark County area, ADEQ referred to EPA's Mapping Tool for HYSPLITs from the Clark County area (see [Figure 5-2](#)). The exceedance day HYSPLIT back trajectories stem from California and not Arizona. All of these facts indicate that none of the Mohave area should be considered nonattainment with the Las Vegas area, even if it is in the same Office of Management and Budget delineated statistical area.

Figure 5-2 Las Vegas Monitor HYSPLITs from EPA Mapping Tool

